

DECEMBER, 1925

Railway Engineering and Maintenance



Better Track at Less Cost

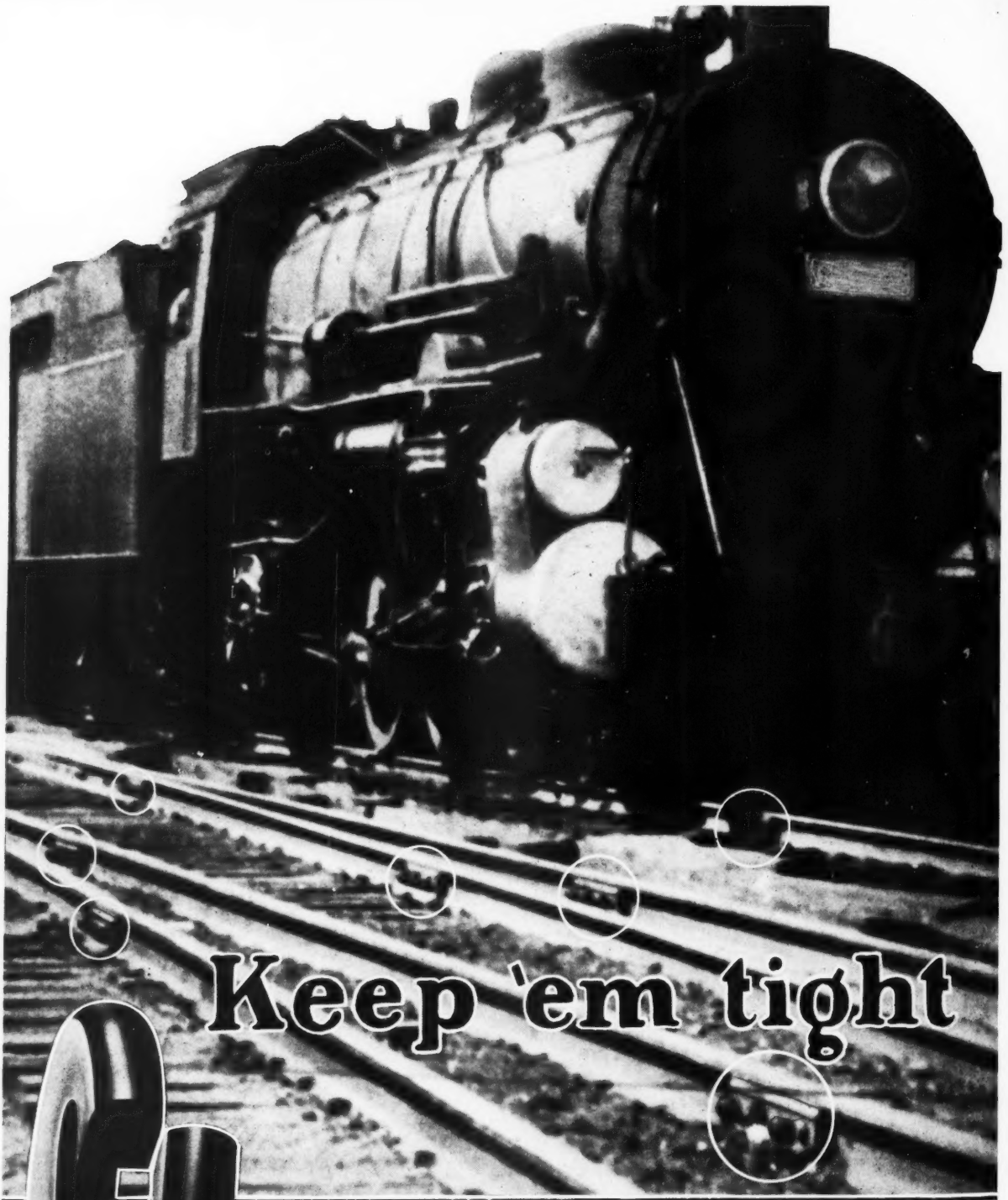
is obtained by the use of IMPROVED HIPOWER. There is a big saving in labor for retightening bolts—the great latent spring pressure forces the joint bars under the rail which assures tight joints at all times.

These tight joints result in a good sound and easier riding track—and prevent bolt breakage, battered rail ends and broken joint bars.

IMPROVED HIPOWER gives a high standard of track maintenance at a low cost for labor and materials.

The National Lock Washer Co.
Newark, N. J., U. S. A.

IMPROVED HIPOWER



Keep 'em tight



HY-CROME

THE RELIANCE MFG. CO.

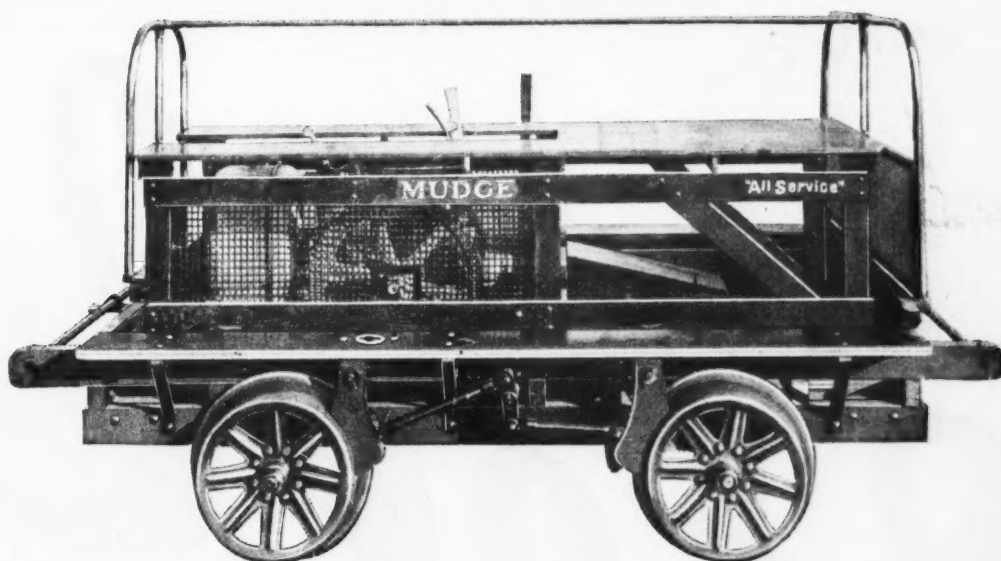
MASSILLON, OHIO

NEW YORK CLEVELAND DETROIT CHICAGO
ST. LOUIS SAN FRANCISCO

N. S. Kenney, Munsey Bldg., Baltimore, Md.
Engineering Materials Co., Ltd., McGill Bldg., Montreal, Quebec, Can.

RAILWAY ENGINEERING AND MAINTENANCE

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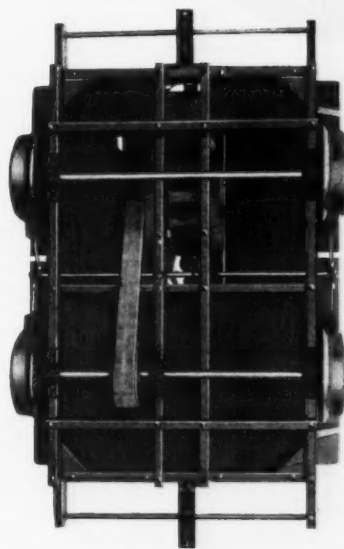
Mudge analyzed the job —then built the car

TO haul ten men—or add a trailer and haul twenty men or a load of ties. Powerful enough for unusual work and light enough for small section gangs. And above all retaining Mudge quality and Mudge simplicity. To fill that bill Mudge built the WS-2.

Sturdiness! Carefully selected maple and oak frames give strength, and add "spring" to absorb the knocks. Power! An 8 H. P. single cylinder engine developing more than its rated Horse Power furnishes that. And the crank shaft and wheels run on roller bearings.

Simplicity! You can take down the whole motor in the field in twenty minutes.

Really built for an "all service" job. That's the Mudge WS-2.



Bottom view of car, showing sturdy construction of frame and steel corner braces.

A motor car for every use

Mudge & Company

**Manufacturers—Railroad Equipment
Railway Exchange Bldg. • CHICAGO**

Reinforced-Steel



Steel

THE steel tank costs less in the end than any other. It has the most economical combination of first cost and length of life.

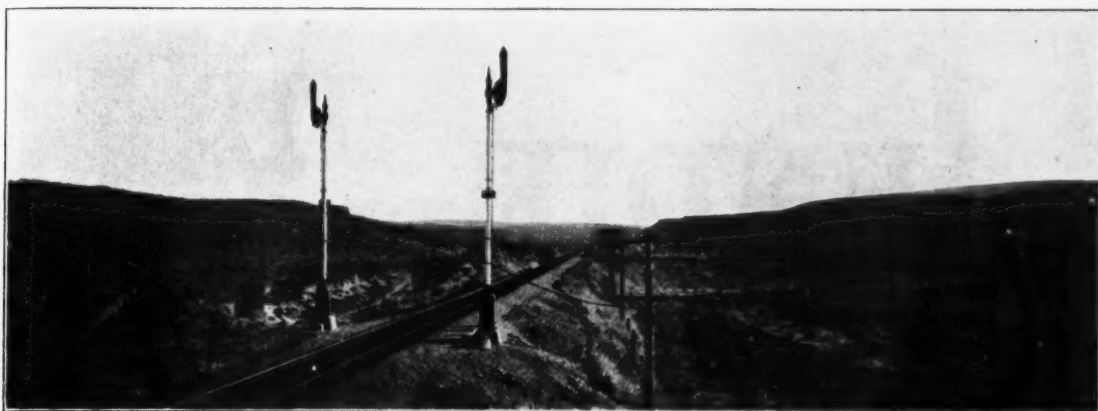
You and other officials are relieved of responsibility wherever you have a steel tank. The manufacturer is responsible for materials and workmanship during construction—and there is no maintenance required except occasional painting.

Steel tanks are tanks you can depend on

CHICAGO BRIDGE & IRON WORKS

CHICAGO, 2452 Od Colony Building; NEW YORK, 3156 Hudson Terminal; CLEVELAND, 2202 Union Trust Building; DALLAS, 1646 Praetorian Building; SAN FRANCISCO, 1007 Rialto Building; ATLANTA, 1036 HEALEY Building; HORTON STEEL WORKS, LTD., Bridgeburg, Ont.; Montreal; Toronto; Winnipeg.

HORTON TANKS



Double Location of Automatic Signals on the Northern Pacific Near Poha, Wash.

Railway Engineering and Maintenance

Formerly the Railway Maintenance Engineer

Vol. 21

December, 1925

Number 12

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WOULD YOU LIKE TO KNOW

How to heat stone uniformly for winter concreting?

How to lay a pipe line under water?

How to get material delivered promptly by the storekeeper?

How to insure free movement of switch rails in heavy track construction.

How to train a track walker?

Answers to these and other questions will be found in this issue.

ELMER T. HOWSON
Editor

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Associate Editor

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Associate Editor
(Washington, D. C.)

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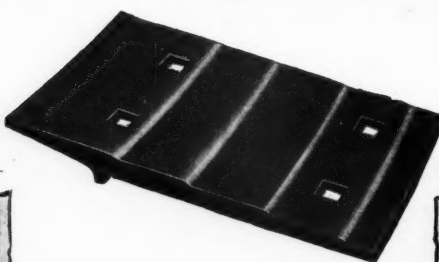
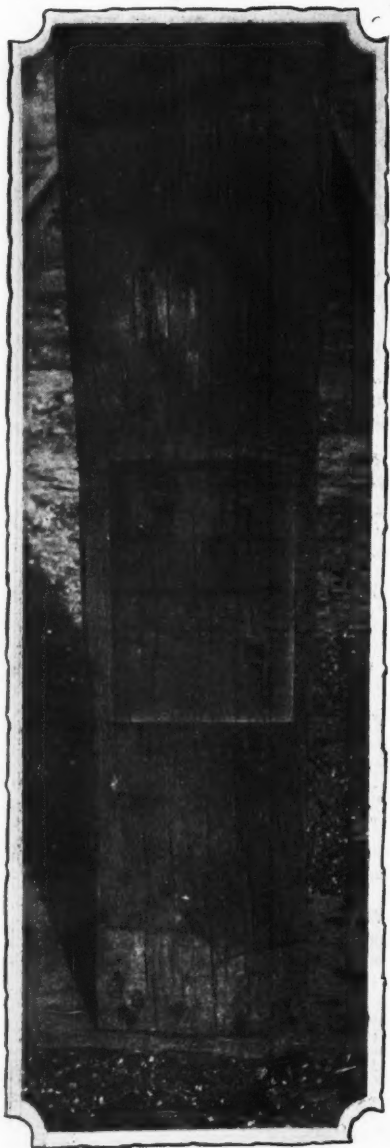
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Under the same traffic conditions

LUNDIE TIE PLATE

Gives tie protection

Lundie protection



Tie destruction



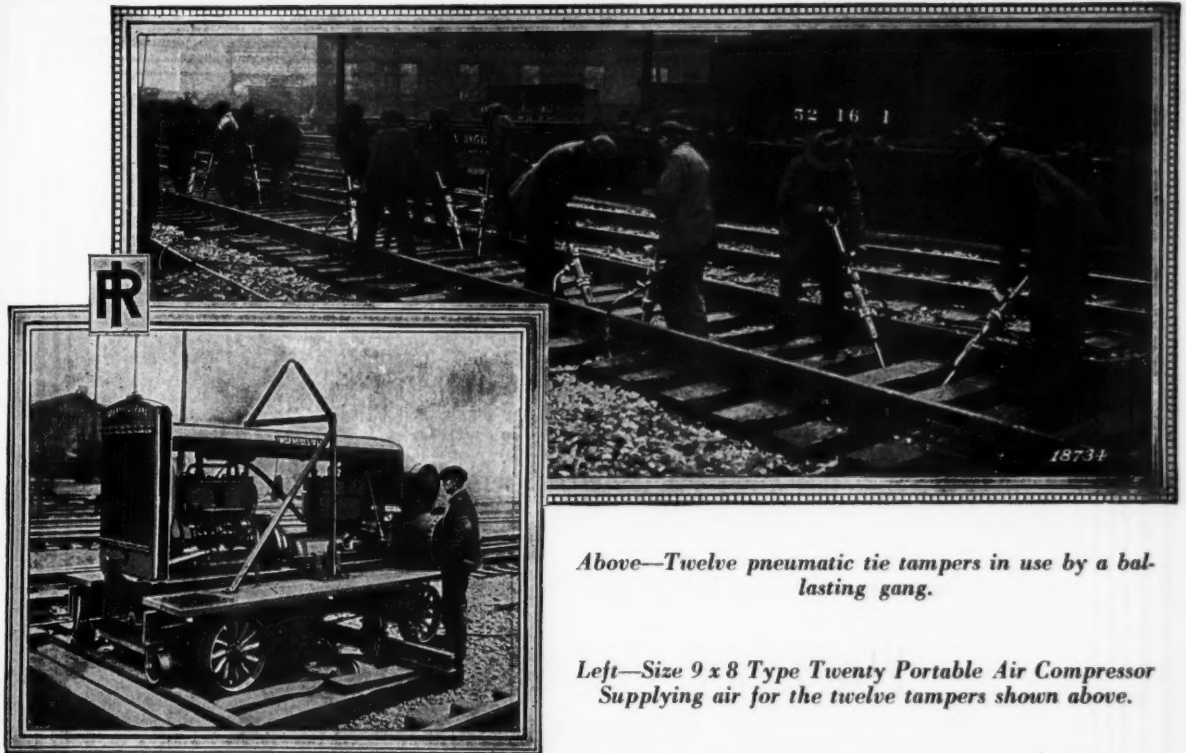
FIVE YEARS of identical service on a heavy traffic eastern road show the actual saving in costly ties through Lundie Tie Plate protection.

One tie nearly worn out.—The Lundie protected tie, good for many more years of service.

Such remarkable saving is due solely to the design of the Lundie Tie Plate, which compresses the tie, without cutting a single fibre.

The Lundie Engineering Company
920 Broadway, New York
166 West Jackson Boulevard, Chicago





Above—Twelve pneumatic tie tampers in use by a balasting gang.

Left—Size 9 x 8 Type Twenty Portable Air Compressor Supplying air for the twelve tampers shown above.

Pneumatic Tamping

The Most Efficient and Economical Way to Tamp Track

Actual records of track work show that with pneumatic tie tampers three to five times as many feet of track are tamped per day as by hand tamping.

The tamping is more uniform, considerably more ballast is tamped under each tie, and the ballast is tamped harder. The result is that the track is put in better line and surface in the beginning and remains so for a much longer period than is possible with any hand tamping.

Ingersoll-Rand Pneumatic Tampers not only speed up the tamping but lighten the work. Less effort is required to hold and guide the air tamper than to swing a pick or bar.

INGERSOLL-RAND COMPANY—11 BROADWAY, NEW YORK CITY

Offices in principal cities the world over

FOR CANADA REFER-CANADIAN INGERSOLL-RAND CO. LIMITED, 260 ST. JAMES STREET, MONTREAL, QUEBEC

Ingersoll-Rand

**THE OXWELD
RAILROAD SERVICE COMPANY**

representing

THE LINDE AIR PRODUCTS CO.
(Linde Oxygen)

THE PREST-O-LITE CO., Inc.
(Prest-O-Lite Acetylene)

UNION CARBIDE SALES CO.
(Union Carbide)

OXWELD ACETYLENE CO.
(Oxweld Apparatus and Supplies)

**Railway Exchange
Chicago**

**30 East 42d Street
New York**



A NEW BUDA MOTOR CAR

Another of the **DEPENDABLE NINETEEN SERIES**, Engine 12-14 Horse Power—4 Cycle

No. 119 MOTOR CAR—Air Cooled

DISTINCTIVE FEATURES

Ample power for grades, trailing loads and head winds—weight over front axle—easily handled—all parts of the power plant accessible

Friction
Disc
Transmission
with
Hyatt Roller
Bearings



4 Wheel
Brakes
with
Adjustable
Toggles

STARTS UNDER ITS OWN POWER—FULL HORSEPOWER AT ALL SPEEDS—WILL PULL HEAVY TRAILING LOADS

The anti-friction bearings provided at all points of friction transmit the greatest percentage of Horse Power to the driving wheel

Write for descriptive catalogue

THE BUDA COMPANY

HARVEY (Chicago Suburb) ILLINOIS

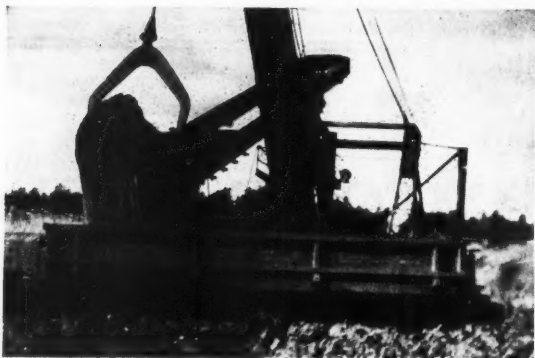
30 Church Street
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LONDON



Car can dump material of any size. There is no obstruction to the discharge of the load. Anything that this 8-yard dipper can load the Differential Car can dump. The floor is constructed to withstand the severe punishment received in loading huge rocks. This floor construction is a new and exclusive feature.

IT WILL PAY YOU

to investigate

DIFFERENTIAL AIR DUMP CARS

They will last longer and the maintenance charges will be less

because

They are scientifically designed and constructed to receive punishment and stand up under it.

THE DIFFERENTIAL



The extreme low height makes the Differential Car very easy to load. The accompanying photograph shows the 24-yd. (level full) car being loaded full length with standard ditcher.

Saves time in loading, saves time at the dump, can be loaded to greater capacity, saves labor at the dump due to casting material well away from track, and keeps the ballast clean.

Dumping action is quick. It is certain. It is sure to dump when you want it to, but only then.

The discharge angle, 50°, insures clear dumping of all classes of material.

It dumps to either side by simply turning lever in desired direction of dumping. And no change in mechanism is necessary.



DIFFERENTIAL AIR DUMP CARS

in your budget

forecast big economies for 1926

THEY FILL EVERY DUMP CAR REQUIREMENT

—and—

They are constructed to ride in train at high speeds, evenly and without danger.

They are safe. No locking mechanism to get out of order.

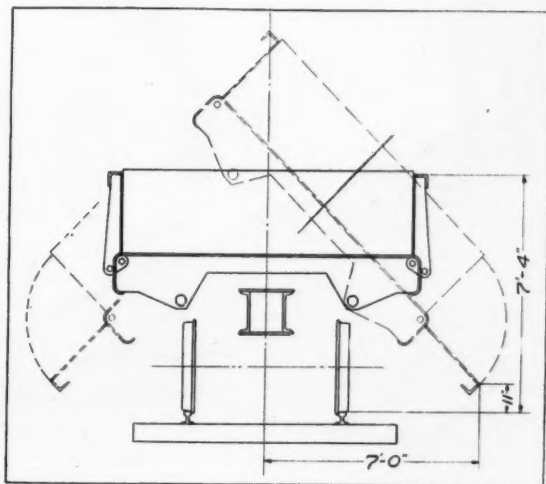
They dump further from the track. The down folding door chutes the material away.

They are far lower and easier to load.

They dump to either side without changing any mechanism. Simply move lever to one side or the other.

SEND FOR BULLETIN D-15 FOR COMPLETE DESCRIPTION

STEEL CAR CO., FINDLAY, OHIO



The down folding door chutes the material away from the track. Dumping about trunnions over the gauge line on the dumping side instead of about center line trunnion, gives even further distance from the track and in addition this scheme allows for extreme low height and stability.

Although the dumping action is speedy there is no destructive shock to the track structure, trestles, or to the car itself.

20 OR 4000 BLOWS?

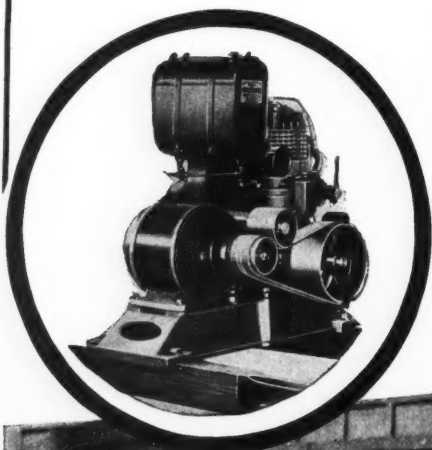
The average man with a pick will deliver about 20 uneven blows to the ballast a minute.

A Jackson Electric Tie Tamper delivers 4000 uniformly applied blows per minute, each blow in the proper direction.

The rate of advancement is correspondingly rapid and, equally important, the roadbed is evenly tamped.

Power for the Jackson Electric Tie Tamper is furnished by the Jackson Power Plant.

Each plant is capable of operating 4 tampers in unison, giving a total delivery of 16,000 blows per minute.

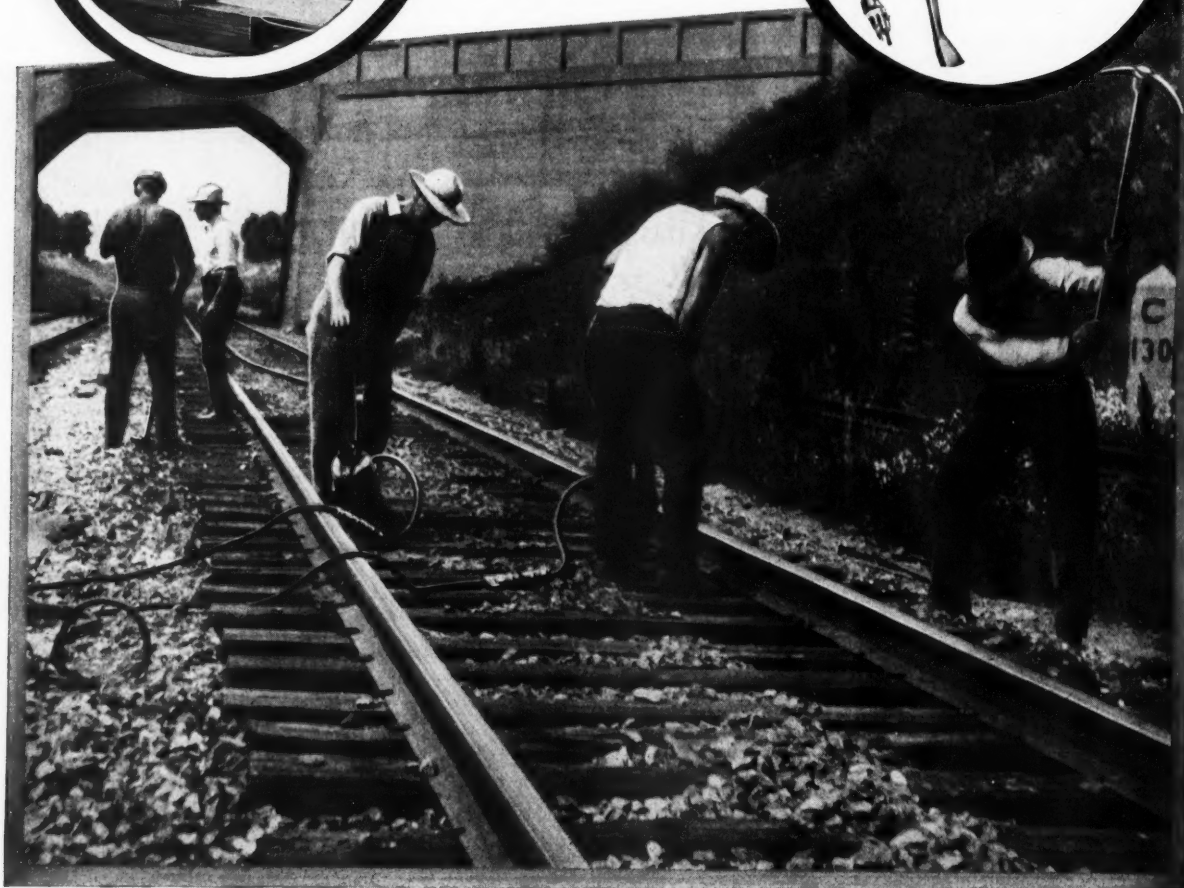


The power plant is light in weight, portable and can be moved to any place along the track. It requires no special foundation.

The power plant is also universal. Furnishes power for light and tools that are usually operated from commercial power circuits.

Write us for full details.

ELECTRIC TAMPER & EQUIPMENT CO.
RAILWAY EXCHANGE CHICAGO, ILLINOIS

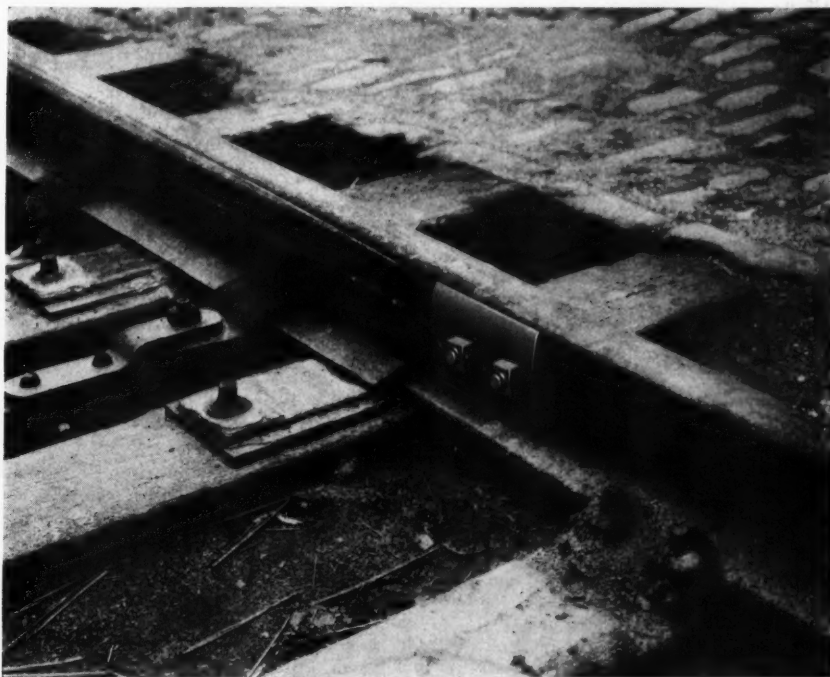


The Reversible "Mack" Switch Point Protector THIS IS IT!

A NEW and distinct maintenance economy is made not only possible, but entirely practical, in the Reversible "Mack" Switch Point Protector. Mechanically, it is simplicity itself. As shown in the illustration, the "Mack" as now made, gives double the service by means of the simple operation of inverting it after one edge shows sufficient wear to make a new protector advisable.

In other words, the lower edge becomes the top edge and the service life of the protector extended to double the wear without additional cost.

Positively the most economical way to protect the switch point—and add years to its life.



An Economic and Safety Device

LET the Mack Switch Point Protector absorb the wear and increase the life of your switch points.

Mack Switch Point Protectors are simple, inexpensive, and positive in action. For switch points to last ten times longer with this protection is not uncommon in actual service tests.

Installation can be made easily at small cost—replacements are made in a few minutes by one man—their efficiency is not impaired by weather conditions.

"Mack" Switch Protectors are made of manganese steel, for any size rail.

Send us a description of rail used, and we will furnish you a few protectors for test

J. R. FLEMING & SONS, INC.
SCRANTON, PA.

Patented in U. S. and Foreign Countries

RACOR

SEVEN WORKS

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CHICAGO, ILLINOIS
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PUEBLO, COLORADO
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NIAGARA FALLS, CANADA



RACOR
Heat Treated Heavy
Duty Guard Rail Clamp

RAMAPO
Safety Switch Stand
Style No. 17



RACOR
Drop Forged
Rail Brace

RACOR
Adjustable
Rail Brace

HEAVY DUTY HEAT TREATED
GUARD RAIL CLAMPS

DROP FORGED RAIL BRACES

ADJUSTABLE RAIL BRACES

EUREKA ADJUSTABLE CLIPS

MANGANESE REINFORCED
SWITCH POINTS

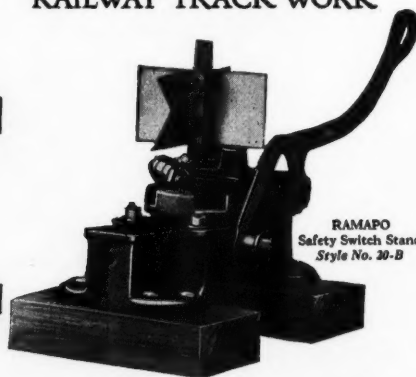
RAMAPO AUTOMATIC
SAFETY SWITCH STANDS

AJAX MANGANESE ONE-PIECE
GUARD RAILS

SWITCHES - FROGS

CROSSINGS - SPECIAL

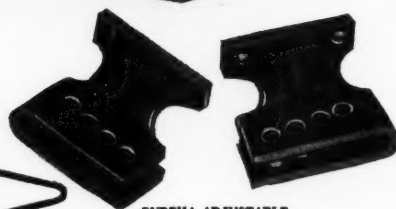
RAILWAY TRACK WORK



RAMAPO
Safety Switch Stand
Style No. 20-B



AJAX MANGANESE
One-Piece
Guard Rail

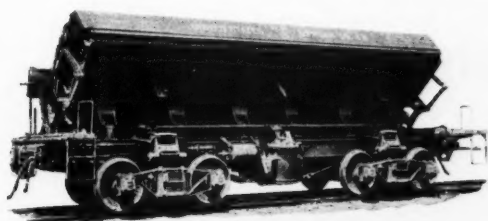


EUREKA ADJUSTABLE
Open Side Switch Clip

Main Office - HILLBURN, NEW YORK
SALES OFFICES AT WORKS, ALSO
30 CHURCH STREET, NEW YORK
McCORMICK BUILDING, CHICAGO

RAMAPO AJAX CORPORATION

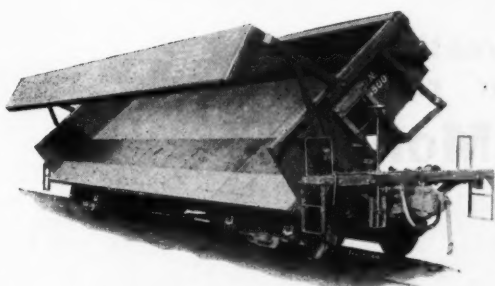
16yds. 20yds. 30yds. Koppel Automatic Air Dump Cars



In Stock Ready to Ship



*Before you buy any Dump Cars
Get all the facts or better still—
See this Car*



**Koppel Industrial Car and Equipment Co.
Koppel, Penna.**

NEW YORK

CHICAGO

PITTSBURGH

SAN FRANCISCO

The Biggest
RAIL-TIE-ROADBED-JOINT
Saver
Ever Put on a Rail

HEAD-FREE
continuous
JOINT



**A thorough investigation
can save your railroad
A Lot of Money**

The Rail Joint Company
61 Broadway New York City



Wheel Security for the Casey Jones



Full Tread Support

This cross-section shows how the Parsons - spoke supports the ENTIRE WIDTH of the tread—one important reason why Parsons Wheels have twice the strength and three times the wear.

The Northwestern Motor Company has selected Parsons Wheels as standard equipment on the heavy-duty Casey Jones 550.

Thus, over every mile, Casey Jones users are protected by the greater strength which rivetless design and cast-steel construction have built into Parsons Wheels.

And they are assured of wheel-service to match the many years of service they will get from the car itself.

THE PARSONS COMPANY, Newton, Iowa

PARSONS WHEELS

**ONE-PIECE
CAST-STEEL**



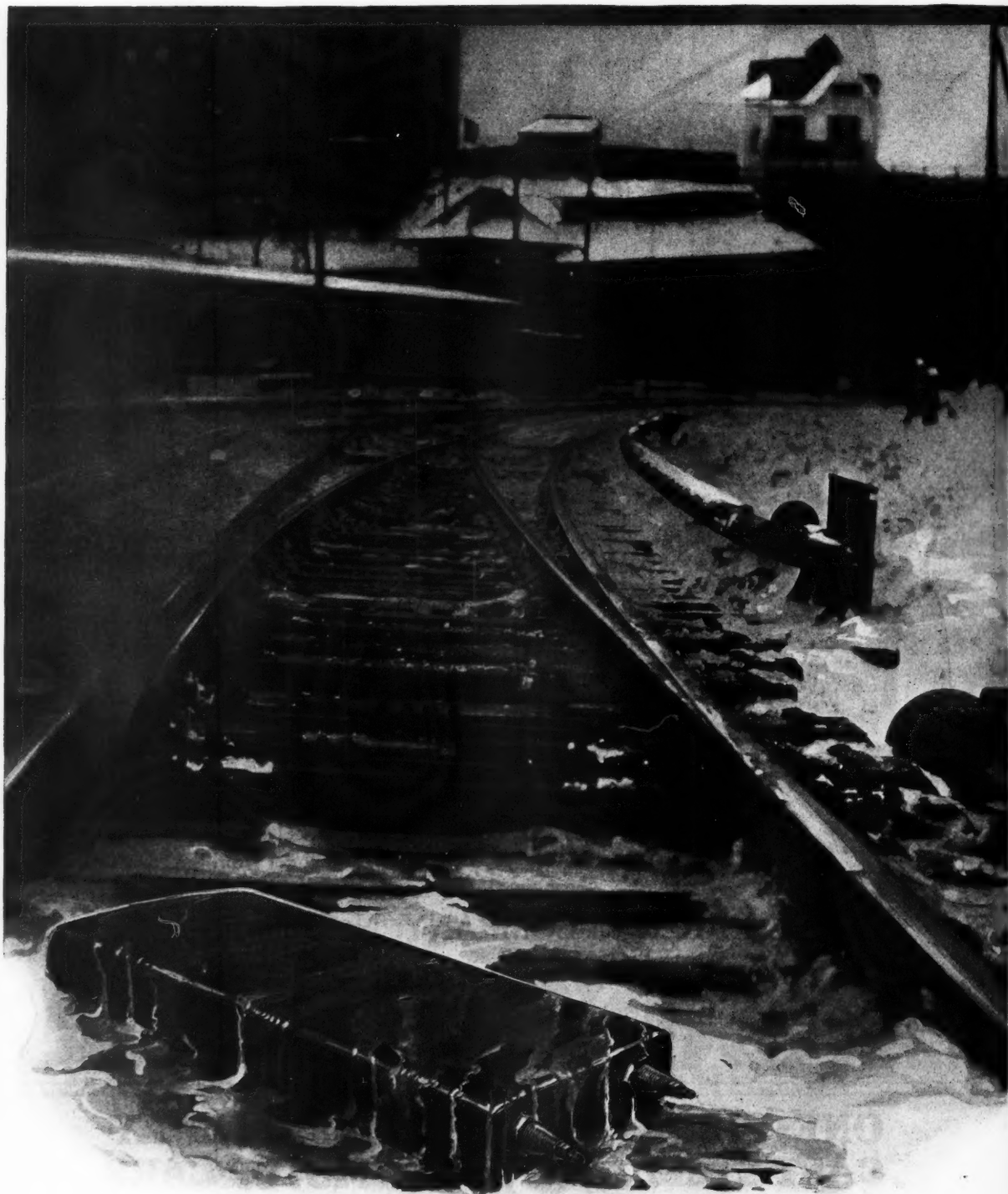
**for RAILWAY
MOTOR CARS**

The accompanying illustration shows a typical installation of Q & C Electric Snow Melters at work during a storm. This is the most efficient and economical solution in solving your clogged switch problems, especially in terminals where the traffic is heavy and constant.

The Q & C Electric Snow Melters are always ready for serv-

ice at any minute for any length of time, and operating expenses are only involved when the current is turned on during a snow storm. The fact that they are now used on the largest roads throughout the country, having effected large savings in operating costs and avoided substantial revenue losses, surely makes them worthy of your investigation—which we invite.

The Q & C COMPANY, 90 West Street, New York — Chicago — St. Louis





The Sheffield 40-B

—no finer car on the rails

In the Sheffield 40-B, Fairbanks-Morse has brought to the section car field a *super* car—in dependability, economy and all-around performance. Whatever service a motor section car may be called upon to do, this car does *well*.

The "40-B" combines many of the newest developments of automotive engineering with time-tested features of section car construction which experience has proved best.

The two-cylinder, opposed, four-cycle, air-cooled, valve-in-head engine provides abundant power with remarkably low fuel consumption and is designed to give exceptional

torque at low speeds. Three-point suspension conforms with the best automobile practice. Greatly simplified friction transmission; drop-forged crankshaft mounted on Timken roller bearings; high tension magneto and improved carbure-

tion, are features typical of the advanced design throughout.

The pressed steel auto-type frame—probably the strongest ever used on a car of this type—provides maximum strength without sacrificing lightness.

The Sheffield 40-B is truly a leader in its class. Ask for bulletin completely describing this car.

COALING STATIONS

The finest equipment, backed by undivided responsibility, permanently guarantees every coaling station

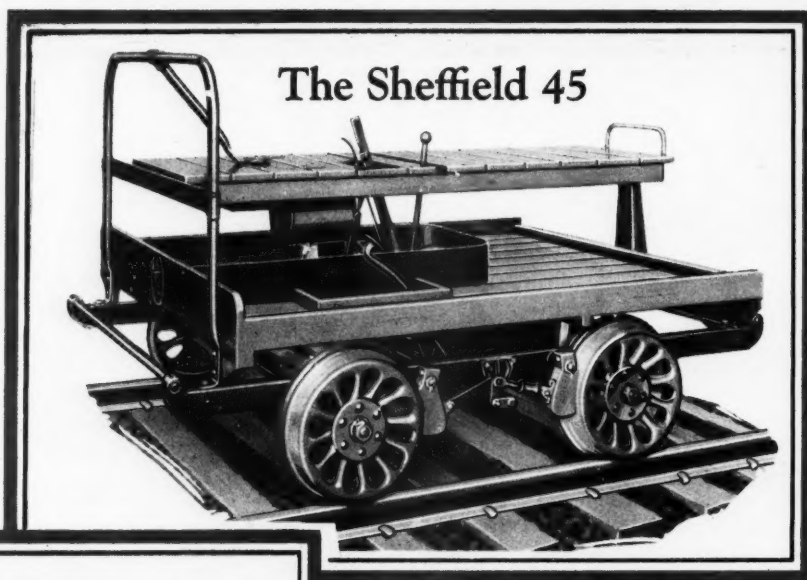
Built throughout by
Fairbanks-Morse

FAIRBANKS-MORSE MOTOR CARS

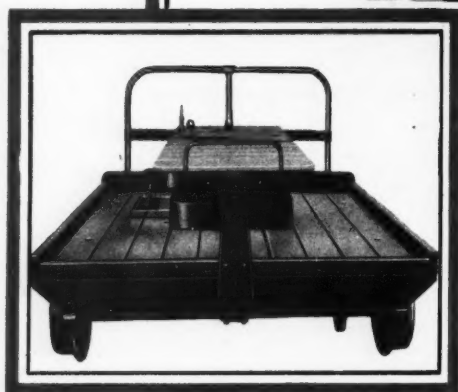
First on the rails

—and still first





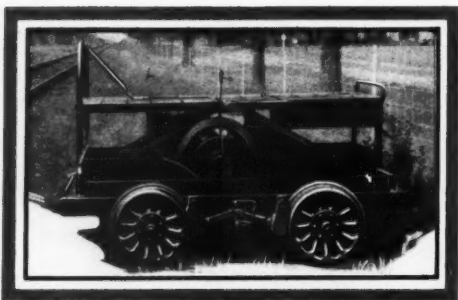
The Sheffield 45



Note single support at the rear and exceptionally large deck space—22 square feet of unobstructed tool space

A brand new car *with many new features*

The Sheffield 45, a recent addition to the Fairbanks-Morse line of motor cars, meets the demand for a two-cylinder friction drive car lighter and more moderately priced than the well-known Sheffield 40-B. The two-cylinder, opposed, four-cycle, air-cooled engine has the patented Ricardo cylinder head, giving 15 per cent more power. Highly developed flywheel magneto gives hot spark at slow cranking speeds. Countershaft is mounted on S.K.F. self-aligning ball bearings. Built with pressed steel auto-type frame, this car has the largest deck space ever provided on a section motor car—22 square feet of unobstructed tool space. Ask for complete information.



Auto-type pressed steel frame gives maximum strength and lightness. Take out four bolts and body can be lifted clear of chassis

The Sheffield 44 *The one-cylinder record-breaker*

Always a popular car, the Sheffield 44, with one-cylinder, water-cooled motor and the clutch that won't burn out, continues breaking performance records for a car of this type. The many advantages of chain drive—positive delivery of power at the wheels, and great reduction in maintenance cost—have been still further increased by the development of a clutch that has a particularly smooth action and *cannot* be burned out. This and other features make the Sheffield 44 an outstanding car in its class. Ask for descriptive bulletin.

FAIRBANKS, MORSE & CO., Chicago

Manufacturers of railway motor cars, hand cars, push cars, velocipedes, standpipes for water and oil, tank fixtures, oil engines; steam, power and centrifugal pumps; scales; complete coaling stations

FAIRBANKS-MORSE MOTOR CARS

First on the rails

—and still first



International

Produces-Grades

Seasons *and* Treats

all its Ties in
Strict Accordance

With the A. R. E. A.
Specifications



International Creosoting & Construction Co.

Galveston - Texarkana - Beaumont

Standard Specification Ties

Specification Ties Mean Maximum Timber

RAILWAY Engineering officers have adopted the A.R.E.A. Tie Specifications to meet their requirements. *International* interprets it as its duty to enforce them.

Railways should insist on standard specification Ties at all times because A.R.E.A. Specification Ties put the maximum amount of sound timber under the rail. They minimize tie renewals and reduce maintenance costs.



Western Air Dump Cars May Be Rented, with Option to Buy

YOU know what tremendous savings can be effected by means of Western Air Dump Cars. These fast, efficient cars are available on a rental basis. Why not take advantage of this plan to get them onto the job?

Thousands of contractors and superintendents in every part of the United States have proved the value of Western Air Dump Cars in cutting costs and gaining time. So certain are the results obtained by these cars that many engineers regard them as standard equipment.

Write today for full details of our rental proposition.



Western

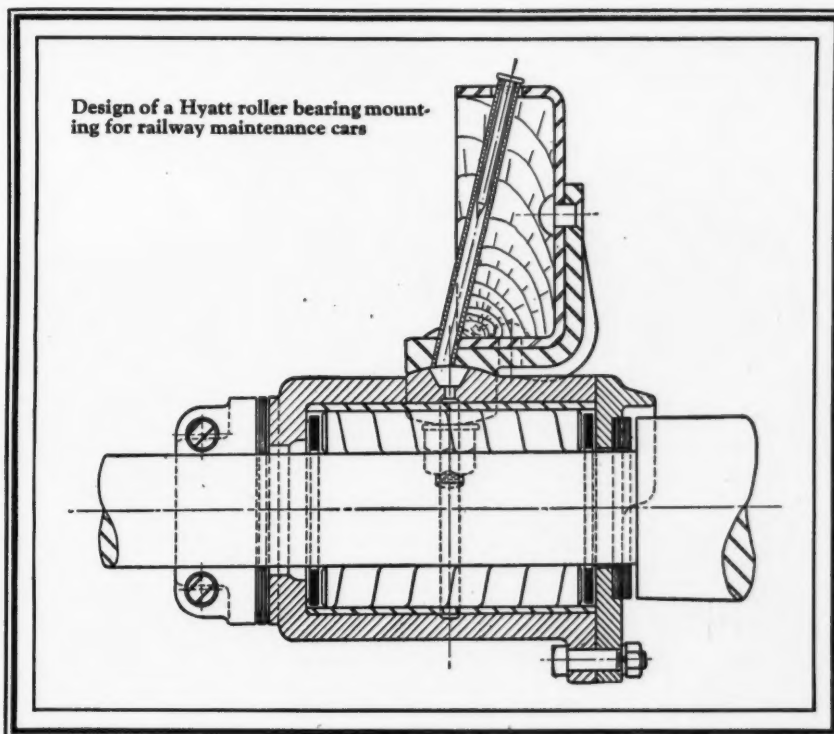
*That's
Why*

Western Wheeled Scraper Company

Earth and Stone Handling Equipment Since 1877

AURORA

ILLINOIS



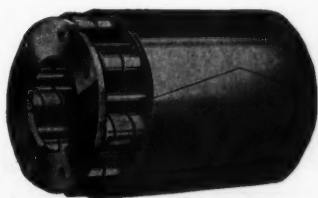
Reduce Costs—Insure Reliability In Maintenance Car Operation

THE cost of operating maintenance cars and the character of service rendered by them are largely dependent on one factor—the car bearings.

Leading car builders have adopted Hyatt roller bearings as best meeting the requirements of this class of service. Their uniformly easy rolling action, their positive oil-conserving lubrication and their rugged durability have proved to be a sure means to operating economies and to dependable performance under all conditions.

Hyatt equipped cars roll easily, saving fuel and man power. They are equal to the demands of hard use and overloading. The bearings require no attention other than oiling once every three or four months—no adjustments, repairs or replacements.

It is not necessary to wait until you need new cars to obtain these advantages. Hyatt bearing replacement boxes for converting your present plain bearing cars are furnished by the car builders. Ask them for complete information.



Hyatt bearings are furnished for all classes of railroad equipment. Ask for information on passenger cars, freight cars, locomotive tenders and turntables.

HYATT ROLLER BEARING COMPANY
NEWARK DETROIT CHICAGO SAN FRANCISCO
WORCESTER PHILADELPHIA CHARLOTTE
PITTSBURGH CLEVELAND

HYATT ROLLER BEARINGS FOR RAILWAY MAINTENANCE CARS

A MOUTHFUL AT EVERY BITE

Just as each of these animals is known for its ability to get a mouthful at every bite, so is each of the various types of Owen Buckets famous for its ability to grab a chuckful load every time the closing line is overhauled.

Owen Buckets, properly installed and operated, are guaranteed to do a bigger day's work than any other bucket of the same weight and capacity — or, write your own guarantee.

The OWEN BUCKET Co.

1205 Rockefeller Building Cleveland, Ohio
 Baltimore Chicago Dallas Los Angeles Minneapolis
 Philadelphia Pittsburgh New York Miami Portland
 St. Louis San Francisco



HACKMANN COMBINATION TRACK LINER

SAVES 60% OF YOUR LABOR AND TOOL COST

HACKMANN
Track Liners
Will
Line Track,
Frogs,
Switches,
Space Ties,
Raise Low
Joints,
Without
Disturbing
the Road
Bed. No Dig-
ging Necessary



60%
Labor Cost
Saved

3 Men With
Hackmann
Track
Liners Do the
Work That
Required 9 to 12
Under the
Old Method
Hackmann Track
Liners Will Pay
For Themselves
By the Saving in
Labor Cost



NO. 1 LINING BAR

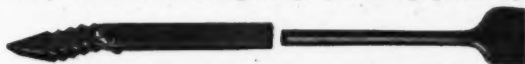
HACKMANN COMBINATION LINING BARS (VERONA MADE—HEAT TREATED)

The No. 1 lining bar with chisel end and the No. 2 combination tamping and lining bar are drop forged from special steel specially tempered with 1-inch drop forged lugs as an integral part of the bars, for use with Hackmann bases.

Tests on different roads have proven conclusively that the new Hackmann Combination Track Liner gives more than double the efficiency of any liner now on the market.

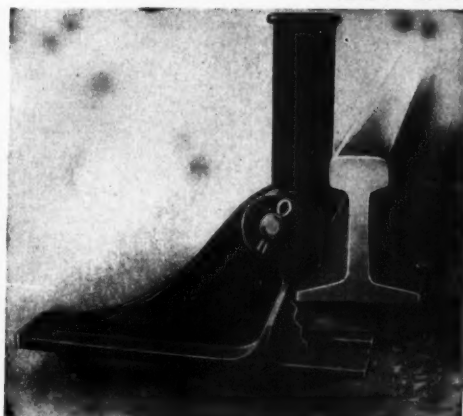
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We Will Gladly Demonstrate the Efficiency of This Equipment Upon Request

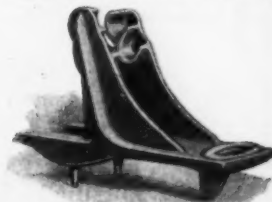


NO. 2 TAMPING AND LINING BAR

**MORE THAN 13,000 OF OUR LINERS NOW IN USE
ON OVER 100 RAILROADS**



NOTE THE TWO STEP
FEATURE AT TOP OF BASE



You can make at least two pulls
without resetting the liner. Just
move the bar to the top notch.

Weight 20 lbs.

The IDOL TRACK LINER

The Idol Track Liner will line track frogs, switches, space ties, raise low joints without disturbing the road bed as no digging is necessary. They will pay for themselves every day by work you will be able to do with a few men. They will save you 50% in labor costs.

The Idol Track Liner can be operated with any ordinary lining bar.

THE HACKMANN RAILWAY SUPPLY CO.

RAILWAY SAVING DEVICES
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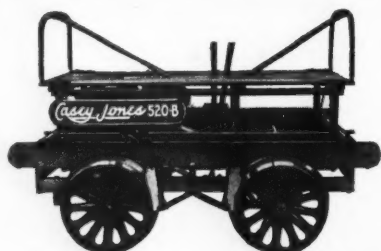
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Equipped with a 6 h. p. ball bearing free running engine, this car is capable of handling all section gangs. The most efficient and economical section motor car—lowest first cost—lowest cost of operation and repairs.



Casey Jones 520B Standard Section Motor Car

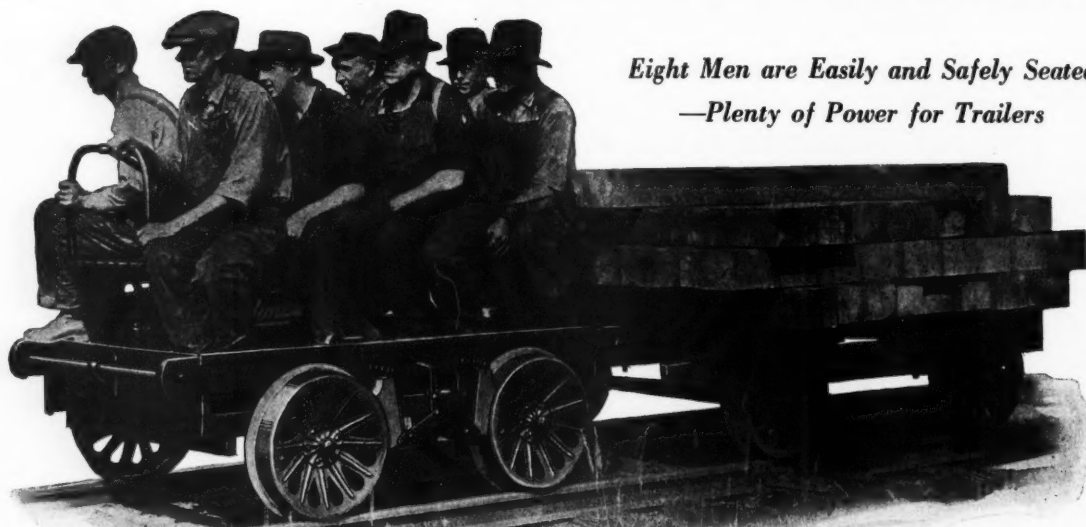
A NEW STANDARD OF MOTOR CAR VALUE

LOWEST FIRST COST

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GUARANTEED PERFORMANCE



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Don't Throw Away Labor and Money, Oiling Pumps Daily



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GARDNER enclosed, self-lubricating pumps are oiled once a month. Their automatic lubrication insures THOROUGH lubrication at all times—something you cannot be certain of with pumps oiled by hand. This means longer life as well as the tremendous labor saving. Ask for bulletins.

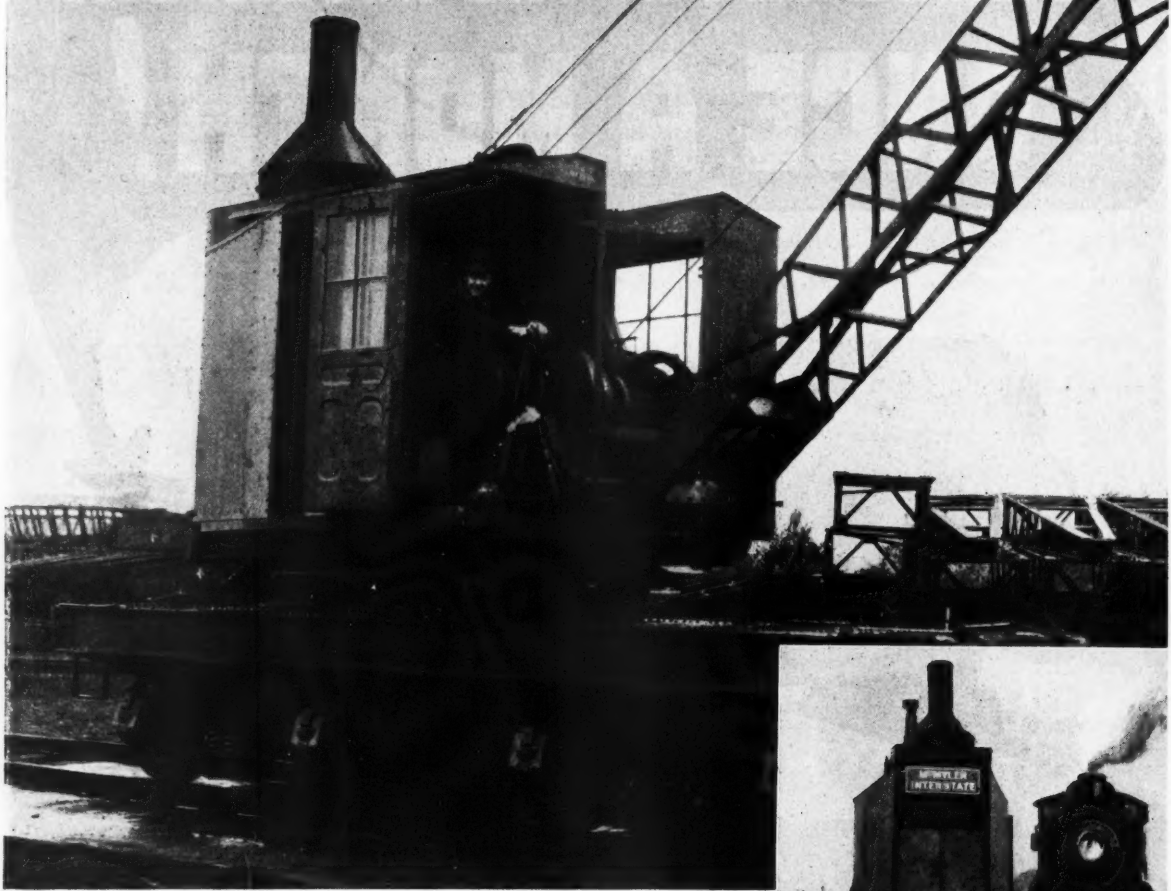
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The No. 2 Bobtail



Does not tie up traffic

The No. 2 Bobtail does not tie up traffic on adjacent tracks. The amount of swing is controlled by adjustable stops which allow the operator to work with speed and safety. He knows that through traffic will clear.

This bobtail crane with ample room for operator and fireman and all mechanism easily accessible is an innovation. You will be interested in studying the floor plan of this crane. Shall we send it to you?

Steam Shovels - Gas Shovels - Locomotive Cranes - Clam-shell Buckets

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ARMCO Culverts in Railway Service

No. 26 of a Series



Name of Railway: Great Northern.

Location: Main line tracks, Fargo to Surrey, N. D.

Traffic: Fast and heavy transcontinental traffic.

Installation Data: A 12-gauge, 36-inch ARMCO Culvert installed 1910, under a 10-ft. fill of sandy soil. Under traffic, 1912.

Condition: Excellent. Inspected and photographed May 19, 1922.

Remarks: Because of their strength and elasticity, corrugated culverts withstand the weight of shifting soils and maintain their alignment in unstable foundations, where culverts of the heavier, rigid type might crack and fail.

There is a manufacturer in almost every state and in Canada, making Culverts, Flumes, Siphons, Tanks, Roofing, etc., of genuine, rust-resisting Armco Ingot Iron. Write for full information and nearest shipping point on products in which you are interested

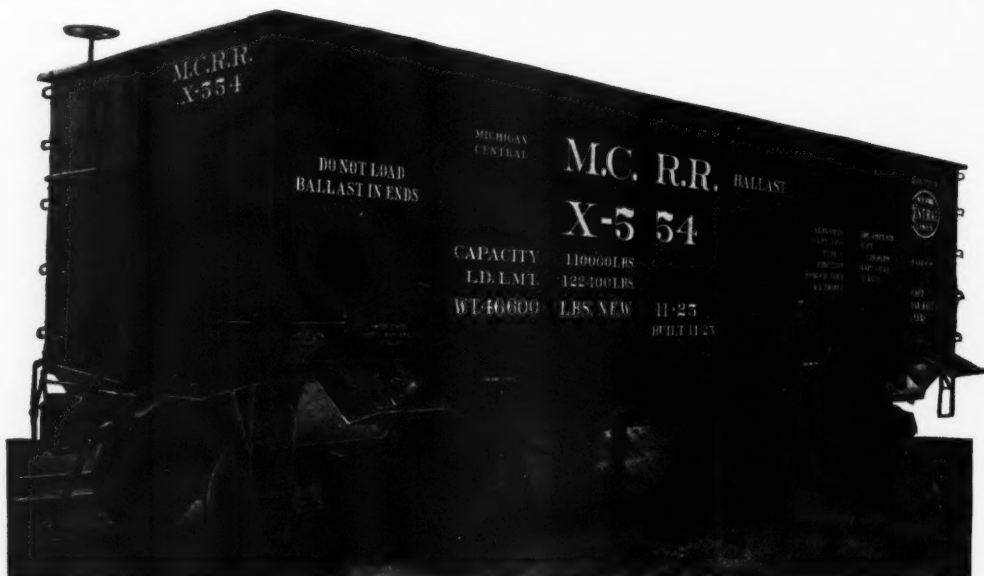


ARMCO CULVERT & FLUME MFRS. ASS'N, Middletown, Ohio

ARMCO CULVERTS

HART SELECTIVE CAR WITH "MAXENDS" FOR BALLAST AND COAL

"MAXENDS" PROVIDE FULL MAXIMUM COAL CARRYING CAPACITY



DISTRIBUTING BALLAST TO CENTER AND TO ONE SIDE

Each side is operated independently in full view of the operator. Amount of distribution under control, as desired for shoulder reinforcement.

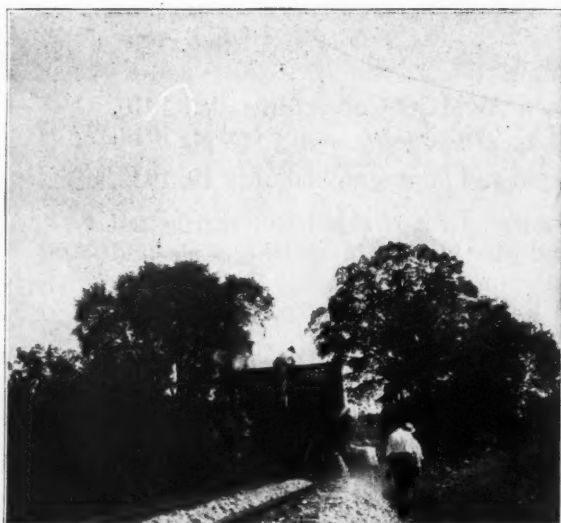


Illustration shows actual work being done by this car, depositing material simultaneously to center and outside of elevated rail on curve for reinforcement.

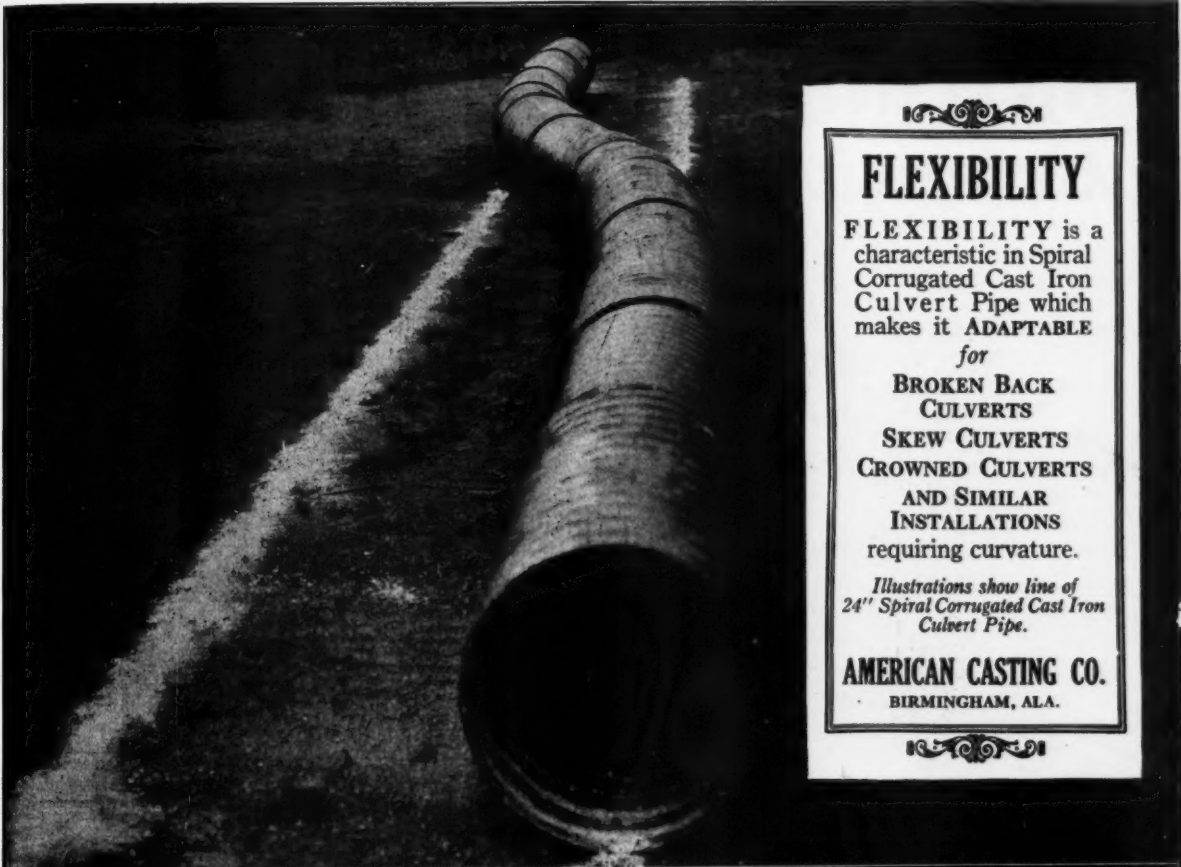


Illustration shows same piece of track after car has passed. Note even distribution of material, no hand work having been done.

RODGER BALLAST CAR COMPANY

523 Railway Exchange, 80 E. Jackson Blvd.

CHICAGO



FLEXIBILITY

FLEXIBILITY is a characteristic in Spiral Corrugated Cast Iron Culvert Pipe which makes it **ADAPTABLE**

for

**BROKEN BACK
CULVERTS**

SKIEW CULVERTS

CROWNED CULVERTS

**AND SIMILAR
INSTALLATIONS**

requiring curvature.

*Illustrations show line of
24" Spiral Corrugated Cast Iron
Culvert Pipe.*

AMERICAN CASTING CO.
BIRMINGHAM, ALA.



MOVING A MOUNTAIN *In Extension Side Dump Cars*

LOW COST OPERATION

TWENTY car trains dumped in five minutes is the regular performance of these air operated Extension Side Dump Cars in filling bridge approaches on the Santa Fe.

This time and labor saving performance is made possible by—

The down turning door which permits a complete and unobstructed discharge of the load clear of the trestle.

The air supply system which provides for the dumping of the entire twenty cars by the operation of one valve handle.

Also the cars are loaded quickly and without delays because no loading restrictions are imposed, the cars will dump anything the shovels can load.

When Extension Side Dump Cars are on the job, low cost operation is assured.

CLARK CAR COMPANY
PITTSBURGH, PA.

New York Chicago San Francisco
52 Vanderbilt Ave. 122 S. Michigan Ave. Rialto Building



Railway Engineering and Maintenance

Volume 21

December, 1925

Number 12

THE 1925 INDEX IS READY

THE INDEX of *Railway Engineering and Maintenance* for the 12 issues of 1925 is available for distribution and will be sent without charge to those who request it. Subscribers who bind their copies or those who for other reasons desire to have this index are asked to advise the editor to this effect and it will be sent promptly.

DON'T BE AFRAID TO TELL ABOUT IT

A RAILWAY OFFICER, while in casual conversation with an acquaintance happened to make some reference to the re-laying of used rail. This led to several questions with the result that the railroad man went into a detailed account of the manner in which the railroads get the last possible year's service out of every rail purchased. The listener was impressed. This was something of which he had had no idea whatever. It was a revelation to him in prudent, economical railway operation. He went away with a better opinion of railway managements than he had had before.

If every railroad man would tell his acquaintances what is being done by his road to produce transportation economically it would not be long before the public would see the railroad in its true light, that of an industry endeavoring in every possible way to render effective service at the least cost.

A GOOD WORKMAN TAKES

CARE OF HIS TOOLS

A RAILWAY maintenance officer who was formerly in charge of painting for a large industrial organization states that the outlay for brushes in the industry with which he was engaged was much less than on railway bridges and buildings for the application of the same number of gallons of paint. In the light of his experience in both industrial and railway maintenance of way painting it is his opinion that the greater economy in the use of brushes in the industry is due in part to more systematic supervision in the issuing of brushes but more largely to the greater effort made by the painters to take care of their brushes.

In the plant in which he was employed each man was allotted a definite number of new brushes each year and had to turn in an old one whenever a new one was issued to him. The brushes were of high quality and the men readily appreciated their value. To guard against any possibility of the men stealing brushes from each other each man was assigned a locker in which to keep his brushes and other tools outside of working hours.

In the opinion of the observer, however, the real reason for the success of this plan lay in the fact that the men knew how to take care of their brushes and were careful of them. This, of course, implied skilled

workmen, a condition made possible by an apprenticeship system and a reasonable permanence of employment. Better care of tools is clearly one of the economies that will accrue to the railroads if they are enabled to perfect some plan for more permanent employment in the maintenance of way department.

WHY MARK TIME ALL WINTER?

THE SEASON'S active improvement program is now at an end, at least in the more northerly parts of the country, and the maintenance forces are being reorganized to cope with winter conditions. In some quarters, although to a decreasing extent of late years, the winter is regarded as a period for marking time, meeting storm conditions as they arise at intervals with little attempt to do constructive work in the meantime.

It has been realized on some roads, however, that it is possible to do certain work during the winter and their forces are employed at such tasks between the periods when they are required for meeting distinctly winter problems, thereby completing and getting behind them a relatively large amount of work that has heretofore been added to the full load of the spring and summer. In an article published elsewhere in this issue, it is shown that certain classes of bridge work can be continued during the winter with advantage, while a discussion in the "What's the Answer" department shows how similar progress is being made in the track department. While the extent to which a program of this character depends to a considerable extent on the policy of the road, much lies within the power of the local supervisor and foreman. The extent of their load next summer will be determined in no small measure by the manner in which they employ their forces during the winter.

CLEANING STONE BALLAST

ONE OF THE problems of track maintenance which is receiving increasing attention from railway men today is the cleaning of stone ballast. Stone has long been recognized as the most suitable material for ballasting heavy traffic lines and other materials are giving way to it as the traffic increases on one line after another from year to year. It has also been recognized that the efficiency of stone ballast decreases as the interstices become clogged with cinders and other dirt.

The cost of cleaning it has been so great, however, that it has been postponed, unduly in many instances, and it is only within the last few years that any considerable mileage of stone ballast has been cleaned. This has been due to the fact that the only practical method has been the cleaning of the stone by hand. A few years ago screens were developed against which the stone and dirt were thrown by hand, which enabled the cost to be reduced somewhat; more recently the screens have

given way in large measure to more elaborate power-operated equipment designed especially for the purpose or to the adaption of locomotive cranes with screens in cars.

The latest and most elaborate development is a vacuum cleaner which sucks the ballast and dirt alike from the roadbed and after removing the dirt returns the ballast to the track, as described elsewhere in this issue. Entirely aside from the application of this equipment for the purpose for which it is designed, it is a striking indication of the progress which is being made in the development of labor saving equipment for the performance of maintenance operations.

THE THIRTY-NINE-FOOT RAIL IS NOW STANDARD

WITH THE APPROVAL by the American Railway Association and the acceptance by the rail manufacturers without premium of the specifications for rails adopted by the American Railway Engineering Association last March, the standard length has been increased from 33 ft. to 39 ft., a change of much importance to track men. While a few roads have secured 39-ft. rails for at least a portion of their requirements for two or three years, the general demand for a higher price by most manufacturers has tended to restrict their use. Now that this premium is waived, the 39-ft. rail is being specified freely in the orders that are now being placed.

The adoption of the longer rail is an indication of the development that is taking place in track maintenance in several respects. In the first place, it reflects the more complete control of rail expansion through the more general use of rail anchors; in fact it is an indication of a stronger track construction throughout. It is also an evidence of the growing use of mechanical equipment for the handling and laying of rails for while the use of equipment of this character has been increasing rapidly in the last few years, it will be practically a necessity with the longer and heavier rails.

The most immediate effect of the increase in length of rails is the reduction in the number of joints by 15 per cent. Since the joint is the weak link in track construction, a reduction in the number of joints not only increases the strength of the track as a whole, but also materially reduces the amount of labor required for surfacing, tightening bolts, etc. The savings in materials effected through the reduction in the number of joints will enable those roads which are limited severely in their expenditures for track materials to secure better types of joints and to equip them with modern accessories to reduce maintenance, and at the same time show savings through the reduction in the number of joints.

In brief, the 39-ft. rail is now the American standard and the roads should take full advantage of the economies offered to secure a stronger track structure.

HEATING CONCRETE MATERIALS

IN AN ARTICLE that appeared on page 393 of the October issue A. M. Bouillon presented some pertinent information on the economy of continuing concrete construction during the winter months. The illustrations cited were particularly impressive because they related to work carried on in parts of Canada where the winters are unusually severe. The article in question was primarily a recital of what had been done and an analysis of the relative difficulties and costs of winter and summer work. On another page of this issue the same author approaches this subject from another angle, that of the methods which must be applied in making winter concrete to insure good results. This article is devoted to but one phase of this problem, namely that of heating the materials. In a later article he will discuss the methods of protecting the concrete from freezing after it has been placed in the forms.

There are those who will not agree with the author's condemnation of the heating of aggregates by blowing or jetting live steam into the material pile. In fact, many prefer this method to the dry heating over steam coils recommended by the author because of the tendency to dry out the stone with the resulting absorption of the mixing water by the dry stone during the process of curing. This objection is overcome if proper precautions are taken for the supplying of moisture to the concrete in the forms to compensate for losses resulting from evaporation or other causes, a point to which definite attention is directed by the author.

Preference for one method of heating is influenced largely by the special conditions. Thus the heating of a pile of stone or sand by the use of the live steam jet, no matter how effective it may be under mild winter conditions, may easily lead to difficulties

where very low temperatures are encountered and any steam escaping from the heated portion of the pile will quickly condense and form frozen masses of stone or sand. The real proof, of course, is in the results and it is well for the reader to bear in mind that the methods described in this article were used on a large scale and were effective in the building of a number of important structures which have given excellent service.

IS THE STORES DEPARTMENT ALWAYS AT FAULT?

THE engineering and maintenance officer expects the storekeeper to provide the materials that he requires for his various operations at the time that he needs them, giving little thought to the steps that must be taken to meet such schedules. If the materials are not there the attention of the management is called to the loss that results from the disorganization of forces, the necessity for their transference to other work or such

FROM THE RANKS

Not long ago a vice-president of a large railway was promoted to executive vice-president. To succeed him the general manager was promoted to operating vice-president. A general superintendent was promoted to general manager. This led to the transfer of a general superintendent to the more important territory left vacant and in turn to the promotion of a division superintendent to general superintendent. Another superintendent was transferred to this important division and a trainmaster promoted to succeed him. A chief dispatcher was promoted to trainmaster and he in turn was succeeded by an assistant chief dispatcher. An operator was promoted to assistant chief dispatcher and an extra operator was promoted to regular operator in his place, making it necessary to employ another extra operator. In other words, to secure an executive vice-president this road only found it necessary to employ an extra or relief operator although 15 men received promotions. The selection of officers from the ranks characterizes railway service to an extent that is not found in any other industry of similar magnitude. It is in truth an industry in which every man has a chance.

other expedients as must be taken. Yet, as was pointed out by J. G. Stuart, general storekeeper of the Burlington, in a talk before the Maintenance of Way Club of Chicago, which is abstracted elsewhere in this issue, it is seldom that the maintenance officer goes to the storekeeper from whom he receives his materials and discusses his program with him.

There is no department of a railway with which maintenance forces have more in common than the stores department, yet contact between them to the extent that each is familiar with the plans of the other is rare. There is much food for thought among maintenance men in the suggestion made by Mr. Stuart that they can afford to become better acquainted with their storekeepers with the purpose of informing these officers regarding the demands that will be made upon them for materials and with the purpose of themselves becoming more familiar with the operations of the stores department, so that they can adapt their schedules to those of the stores department with the object of insuring orderly, regular delivery of the materials when they are required.

A railway is a complicated organization that functions satisfactorily only when each department works in harmony and step with the other departments. There is much to be gained from the promotion of more intimate acquaintanceship between engineering and maintenance and stores officers.

GUARD AGAINST WEAKENING A STRUCTURE WHEN MAKING CHANGES

ON ANOTHER page of this issue we present a report of an investigation of a derailment caused by a rail which broke because the web had been weakened by the successive drilling of bolt holes close together. This case is an interesting one in that it has a distinct parallel in one of the contributing causes which led to the wreck of the airship Shenandoah through deliberate, although perhaps thoughtless, weakening of the structure while making alterations.

That a case of this kind should occur in a rail is decidedly out of the ordinary but it frequently happens that suggestions are made for altering a building by the removal of a wall, the cutting in of a stairwell or the opening up of new windows or doors which would lead to serious weakening of the frame if someone did not give serious thought to the effect of cutting through several joists or the removal of a number of studs.

To illustrate how easily the effect of such changes may be overlooked mention can be made of the Coliseum at Chicago where the exhibit of the National Railway Appliances Association is held each year. The roof of this building is supported on great steel arches, the thrust of which is taken by heavy tie bars connecting the bases of the arches just below the first floor level. Several years ago it was proposed to install a swimming pool in the basement of this building and it was suggested that some of these tie bars be removed so as to clear a space for this pool. Fortunately it occurred to some one to call attention to the serious consequences of this alteration and the plan was dropped.

While it is not often that a local bridge and building officer would be confronted with a case such as this, he frequently is required to pass on plans for altering buildings and more often on proposals for applying greater loads to parts of structures, for example, the supporting of a swing crane from a roof truss in a shop building. In many cases he can rely on his own judgment and experience but where he is not sure he should refer the proposal to the bridge engineer or some other officer who has structural designers at his service.

Letters to the Editor

A LOW COST OF SAWING RAIL

Martinsburg, W. Va.

TO THE EDITOR:

Since the publication of an article in the March, 1922, issue of *Railway Engineering and Maintenance* entitled "How Rail Is Reclaimed on the B. & O.," relative to our rail sawing plant at Martinsburg, W. Va., the output and cost have improved so much that it may be of interest if further mention is made of the operations for the rail sawing seasons for the five years just ending, which are as follows:

| Year | Tons of Rail Sawed | Lineal Ft. | Average Cost per Ton |
|------|--------------------|------------|----------------------|
| 1921 | 7,761 | 534,947 | \$1.28 |
| 1922 | 5,909 | 403,482 | 1.03 |
| 1923 | 12,605 | 802,519 | 1.12 |
| 1924 | 14,770 | 1,057,087 | 0.79 |
| 1925 | 20,208.50 | 1,428,592 | 0.61 |

The tonnage is calculated on the basis of 2240 lbs. per ton, after sawing and drilling, ready for shipment. The cost covers all charges incidental to the handling of the rail, including operation and running repairs to the plant, supervision and overhead charges. Detail charges for the month of May, 1925, were typical in form of those for every month in the year, but were somewhat lower in cost per ton as follows:

| Item | Amount |
|-----------------------------------|------------|
| 1. Feet of rail sawed..... | 268,335. |
| 2. Tons of rail sawed..... | 3,709.02 |
| 3. Labor cost of operation..... | \$1,393.60 |
| 4. Cost of repairs, labor..... | 53.39 |
| 5. Cost of repairs, material..... | 2.13 |
| 6. Supervision | 73.36 |
| 7. Switching | 143.56 |
| 8. Electrical power | 252.72 |
| 9. Air power | 41.08 |
| Total | \$1,959.84 |
| Cost per ton..... | .52 |

In connection with the above figures which show a very decided decrease in the cost per ton during the five years, an explanation of the operations which brought about the decrease in cost may make the statement more clear and of more value to those who are interested in this method of reclaiming rails. The saw plant, drills and derricks in use in 1921 are still in operation and in good condition. The improvements made to speed up operations were brought about by the use of mechanical devices to handle rail, pneumatic clamps at four drill presses to clamp the rail in place for drilling, arrangements for disposing of ends sawed off quickly, all of which eliminate hard labor, the installation of a drill grinder to insure the uniform grinding of drill bits, and make them cut faster and last longer, and a saw sharpener to recondition saws, and make them cut faster and smoother.

Such improvements to the plant have eliminated all hard labor and a marked appreciation by the 18 men operating the plant is noticeable in the fact that they put forth their best efforts every day to better the previous day's output; a check-up on operations of the saw and drills being made with a stop watch and calculated in seconds. This method is now as pleasing to the force as it is to the management. The largest number of rails we unloaded, sawed, drilled and loaded in any eight-hour day this year was 539 of 90-lb. RB section.

Another important feature in speeding up operations at the plant is the proper loading of rail by division forces

so that it can be unloaded rapidly. Our largest output develops when rails are loaded workways with sticks between each layer. Almost any kind of small strips of wood are suitable for this purpose and can be secured along the right-of-way on nearly all roads. Small limbs from trees or willows are very good. With a plant so situated that we must unload one rail at a time, every care should be exercised in loading rails so that they can be unloaded quickly as the various operations are so balanced that the least delay in unloading or in sawing or drilling shows up quickly in the day's output.

S. C. TANNER,

Superintendent of Shops, Baltimore & Ohio.

THE OCTOBER ISSUE

El Paso, Tex.

TO THE EDITOR:

I found much to interest me in the October issue of *Railway Engineering and Maintenance*, but I desire particularly to comment on a few of the articles that appealed to me most.

Cost of Weeding: The first article to which I desire to refer is that on page 373. I am surprised that all railroads do not use chemicals to exterminate weeds, as it is the up-to-the-minute way of getting more time in which to improve the line and surface that so many railroads are sadly in need of. The use of chemicals is preferable to burning. I think, because in time chemicals will tend to sterilize the soil so that seeds will not germinate so readily.

Highway Crossings: We are greatly pleased in our section of the country to be able to get rid of planks for crossings, for they are hard to maintain, warp and become dangerous to traffic. We use rock screenings, put down with fuel oil which eliminate dust, are smoother and better in every way than planks. Although we are in an arid, dusty section of the country we have little trouble with dust, as we sprinkle the roadbed with oil for a width of about six feet beyond the ballast line. The oil is applied quite hot so as to cause it to penetrate the roadbed without running down the embankment. This lays the dust for a considerable length of time and is repeated as need arises.

Raising the Standards of Maintenance Forces: Every man of ordinary intelligence likes a goal to work to. It is not necessary for the officers to overdo generosity; the men do not expect it. But they do expect encourage-

ment of the right sort, and should have it when doing their best to please, even though they *do* make mistakes. I am highly in favor of apprentice foremen if placed under good section foremen, who, when they become efficient enough to take charge of a section as permanent or relief men, should be given every consideration and not "stepped on" too hard at the beginning. This can only be done by promoting them on the district on which they are trained. Seniority rights should only extend over a roadmaster's district, so far as section men are concerned, for if they apply to an entire division or system, apprentice foremen stand no show when vacancies occur as older men bid them in. Where this occurs the younger men become disheartened and seek employment in other lines of work. The older men then pass out within a few years and there are no competent men to take their places. This is a matter that should be given prompt attention as the age limit for entering railway service shuts some good track men out. I think that the age at which a man's usefulness ceases depends on his make-up. Men should be given to understand that their jobs are secure as long as they do their best. I have always made it a practice to use the discharge slip only as the last resort and many times men who prove of less worth at the beginning have become good, reliable men in time. A keen interest on the part of a section man, in my opinion, covers many mistakes as roadmasters who are awake on the job make real foremen from such material.

The article on the proper way of laying rail on page 410 appealed to me strongly. I have always contended that rails were laid too tight in most cases and that when so laid all of the rail anchors in the world will not hold.

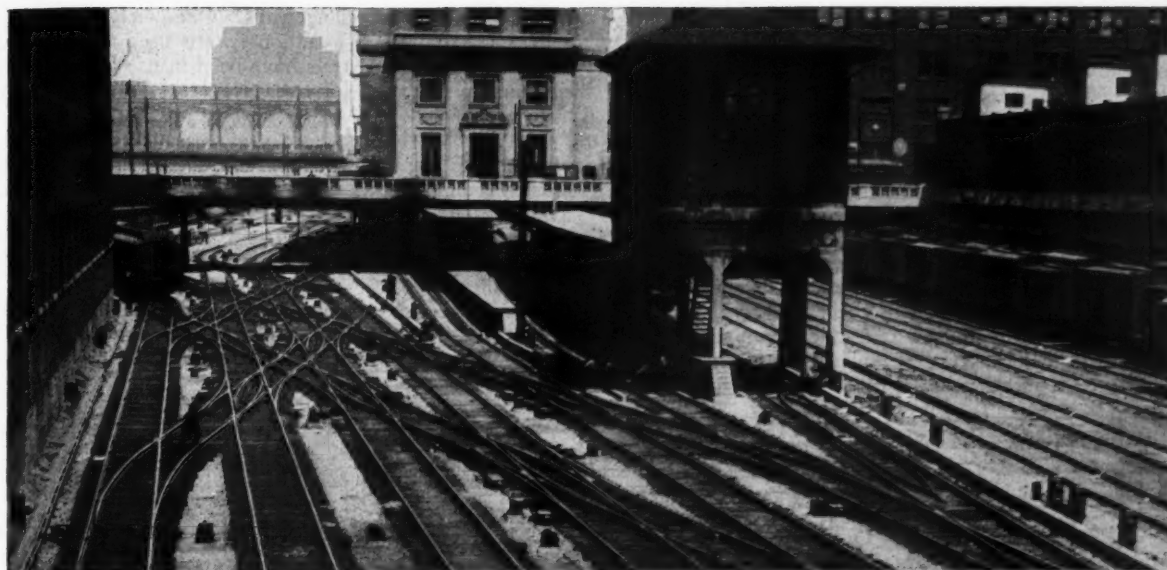
In discussing the question on page 416, I have found that when section gangs are reduced to two or three men and a foreman in the winter there are many things that they can do although much depends on track conditions and traffic. We have section from 10 to 12 miles in length and our traffic is fairly heavy. Aside from emergencies section men should put in all the time possible tightening bolts, changing out cracked or battered rail splices and perfecting gauge, and they should not be allowed to work on such tasks as tie renewals or building up and widening embankments. In other words, they should do only those things which a light force can do most efficiently.

L. FLYNN,

Yard Foreman, Galveston, Harrisburg & San Antonio.



An Example of Good Track Maintenance



Looking North Across the Double-Scissors Crossover Toward the South Station Tracks

Track Work in Chicago Union Station is Unusually Heavy *

**Design and Construction of Crossings, Switches and Slips
with 130-lb. Rail Imposed Many Problems**

BY C. J. NOLAND

Office Engineer, Chicago Union Station Company

THE CHICAGO Union Station comprises a double stub-end terminal having 14 tracks at the south and 10 tracks at the north, with a single connecting track between the two groups. The south station tracks connect by means of a double ladder on the west side with six main approach tracks extending to Roosevelt road, the south limit of the improvement. There are double crossover ladders between Harrison street and Polk street and between Taylor street and Roosevelt road which allow the maximum flexibility of train movement. The north station tracks in a similar manner were designed to connect with six approach tracks extending beyond Fulton street, the north limit. However, only four approach tracks were installed at the north end, extending to Lake street where they merge temporarily into the two existing main tracks.

The station track ladders, from which the station tracks connect in pairs, were laid out primarily with the view to get maximum capacity. In the north yard the location was dependent upon providing clearances for the columns supporting the Madison street viaduct and full advantage of the ladder angle was not obtained. However, in the south yard the only limiting conditions imposed were the columns for the Harrison Street viaduct, where the ladders join with the approach tracks, and the angle found to be the most suitable was determined by connecting the inner station track to the ladder, using the theoretical radius of a No. 8 turnout,

and making the central angle such as not to exceed the turnout curvature for the outer track. This permitted placing the switch points $2\frac{1}{2}$ ft. back of the heel of the frog on the ladder. It also made it possible to avoid the use of sharper curvatures in the connecting tracks than that used in the turnouts. The angle found to be most satisfactory was 19 deg. $12\frac{1}{2}$ min.

The Track Construction

The station platform tracks were laid with 100-lb. P. S. rail on 7-in. by 11-in. by $\frac{3}{4}$ -in. tie plates resting on 6-in. by 8-in. by 2-ft. 6-in. creosoted yellow pine blocks imbedded in concrete with a trough between the inner ends of the two lines of blocks for drainage.† This type of construction extends for practically the entire length of all station platforms. It was used also for nine of the turnouts, which were located at points where it was not desirable to use the ballasted type of construction.

The ladder and approach tracks including the turnouts, slips and crossings were laid with 130-lb. P. S. rail on 7-in. by 9-in. by $8\frac{1}{2}$ -ft. cross ties and 8-in. by 10-in. by $21\frac{1}{2}$ -ft. ties at the crossings. A concrete slab was provided under the ballast to insure a solid foundation for the tracks from Lake street to the north station tracks and from the south station tracks to the limits of the crossover systems between Harrison and Polk streets, and under the crossover system between Taylor street and Roosevelt road, leaving a comparatively short portion of the south approach tracks between Polk and Taylor streets on a standard ballasted construction.

The cross ties and switch ties were of red oak, some

*Abstracted from a paper presented before the Western Society of Engineers on October 12, 1925.

†For a complete description of the concrete track support see the article by Joshua D'Esposito in the *Railway Maintenance Engineer* for September, 1923, page 353.

zinc treated, but the majority were treated by the empty-cell process with a minimum of 8 lb. of No. 1 A. W. P. A. creosote oil. The blocks were mostly short leaf yellow pine. Some red oak blocks were used but they did not prove entirely satisfactory, due to bad checking.

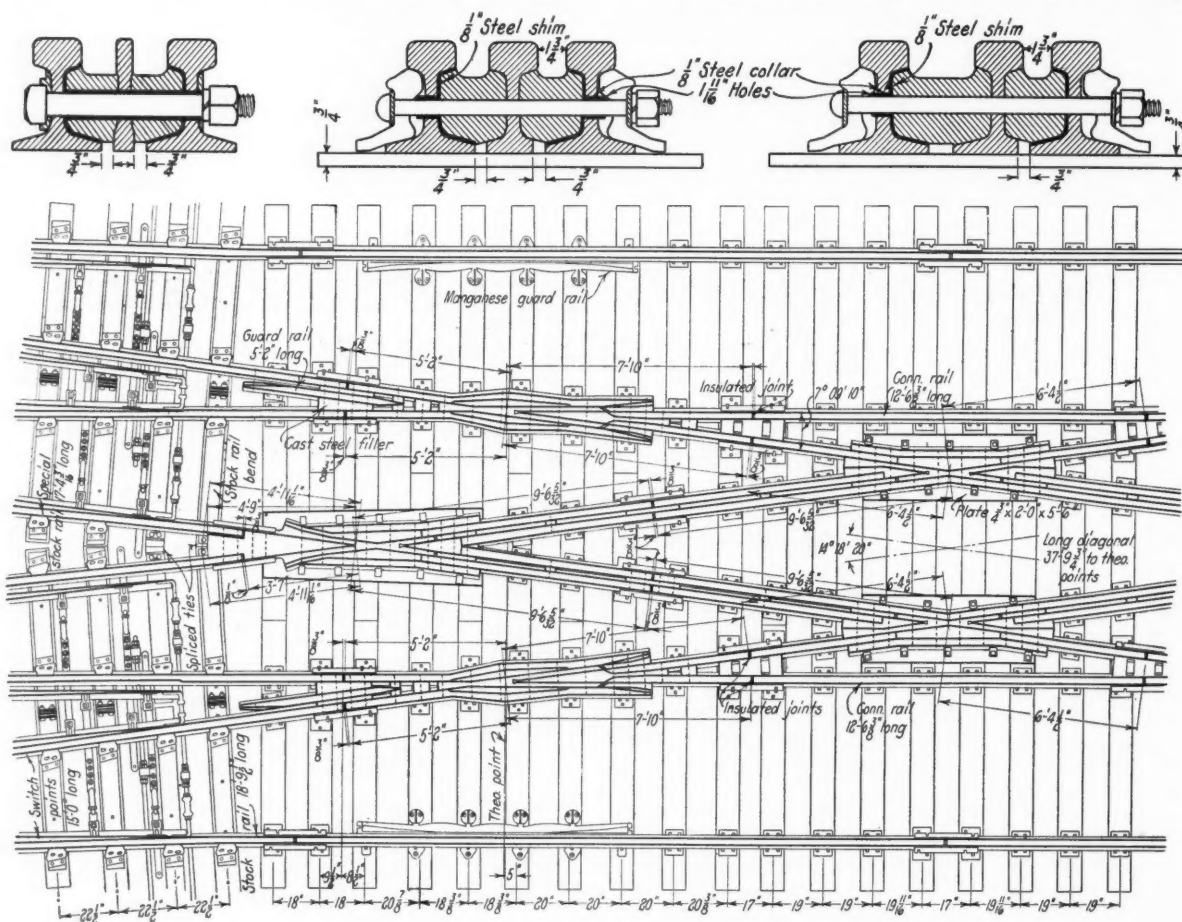
Turnout Designs

In all of the track studies, one of the requirements was to avoid special work. Number 8 turnouts and slips were taken as the prevailing standard, the exception being the crossover system at the south limits connecting to the coach yards where No. 9 turnouts and slips were used and a few No. 7, No. 10 and one No. 12 turnouts were used at special places. Practically all turnouts and slips are of 130-lb. rail. Standard Pennsylvania plans

throats and 1 $\frac{3}{4}$ -in. flangeways. One-piece cast manganese guard rails 8 $\frac{1}{2}$ -ft. long were used throughout. Many of these guard rails have been in use at the south entrance to the yard for over five years and show very little wear.

The double-scissor crossover system at the outer ends of approach tracks and at the entrance to station tracks crosses the main tracks which are 13-ft. center to center. The diamond crossings have either two double slips or a turnout and a slip at each end, and it was necessary for the end frogs of the crossings to join with the stock rail of the slips.

It was necessary to place a guard rail in the toe end of the slip frog to protect the end crossing frog. This was accomplished by using 13-ft. end frogs for the slips



Part Plan and Typical Sections of the Diamond Crossing

were used for split switches and frogs with some modifications.

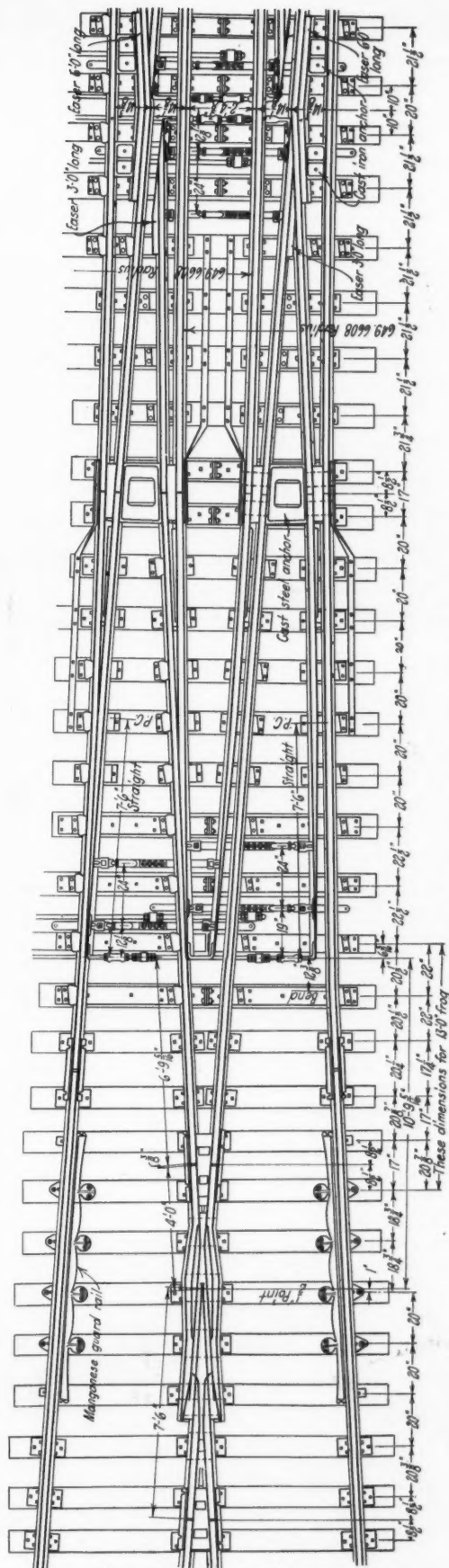
The No. 8 turnouts have a 70-ft. lead; 18-ft. switch points, a 6 $\frac{1}{2}$ -in. spread at the heel and a 4 $\frac{1}{2}$ -in. throw at the point. They are equipped with 13 pairs of plates, cast steel heel blocks and three pairs of adjustable braces. The 130-lb. rail required the angle bar on the gage side to be bent, with a thimble on the front bolt to allow for proper tightening of the bolts and afford free movement of the points. The plates are 7-in. wide, made from 1 $\frac{1}{2}$ -in. stock and planed to $\frac{3}{4}$ -in. for the stock rail and $\frac{1}{8}$ -in. to 5/16-in. for the risers. The lengths vary. The 130-lb. rail was spiked to the turnout curve of 12-deg. 10 min. without being previously curved.

The frogs are of the cast manganese center, rail-bound type with cast steel heel and toe blocks and 2 $\frac{1}{4}$ -in.

and a split filler with a 5-ft. 2-in. guard extending 3 ft. 3 in. beyond the toe of the frog, fastening the end to the stock rail of the slip. The crossing frogs are cast manganese rail bound with a continuous guard and provide 4-ft. 8 $\frac{1}{2}$ -in. gage with a 1 $\frac{3}{4}$ -in. flangeway. The end frogs as well as the center frogs are interchangeable. The end frogs with wing rails are 13-ft. 5-in. long, the center frogs 15-ft. 10-in. long and the four frogs weigh approximately 17,000 lb.

Double-Slip Switches Given Much Study

Considerable study was given to the design of the double slip switches, the object being to work up a design which would be considered a masterpiece in trackwork. Due to using 130-lb. rail it was necessary to have heavier construction throughout and there was little precedent



to follow. Full sized drawings were made of the end points, movable points and connections, and the locations determined. The stock rails connecting with the end frogs were notched $\frac{1}{4}$ in. to protect the switch points and at the same time allow them to be placed at the extreme limits.

In the No. 8 double slips, 15-ft. switch points were used, curved from the end of the head planing to a radius of 649.66 ft. (the radius of the outer rail for the slip) with a 4½-in. throw at the points. At the heel of the switch points joints were also made in the stock rails, fastening them together by cast steel heel blocks and anchor blocks which hold the rails on each side of the center line together rigidly. This joint construction rests on two 7-in. by 1-in. plates extending under the entire row of joints. In addition four anti-creeper straps ¾-in. by 2-in. are fastened to the rails at the joint and spiked to the four ties on either side. Two cast steel anchor blocks were placed between the easer rails and the outer connecting rails which, with the braces, hold the center of the slip rigidly.

Details of the Parts

The movable points are 12-ft. long, with a 4-in. throw and 8-in. between points. They have 3-ft. easer rails. The knuckle rails are 24 ft. 8 in. long with 6-ft. easer rails and the connecting rails are 24 ft. 7 in. long. Four plates at the end points, two at the joints and four at the center points extend under the entire slip. These plates are cut, turned up and bolted with fiber insulation at the center. The other plates are in pairs between the center long plates and the joints and under the separate rails between the joints and the long plates for the end points. All plates are 7-in. by 1-in., planed from solid plates to $\frac{3}{4}$ -in. for the stock rail and to $\frac{3}{4}$ -in., $\frac{7}{8}$ -in. and $15/16$ -in. for the risers, thus eliminating riveted risers entirely. In all 74 special plates are required for each slip.

Adjustable rail braces made of malleable iron are used throughout. They are held down by bolts having square countersunk heads so as to set flush with the underside of the plate, the nut on top. To facilitate slipping the braces in place over these bolts the bolt holes in the brace are elliptical with the long axes at right angles to the rail. The outer edge of the brace was tapered, the stop on the plate was set at right angles and a tapered wedge driven in between the brace and the stop, allowing the brace to remain correctly centered on the plate. This has proved satisfactory both as to installing and maintaining. For the standard No. 8 double slip, 76 of these braces are required. The gage is 4-ft. 8½-in. on straight track, 4-ft. 8¾-in. at switch points and 4-ft. 8⅞-in. on curved track.

The No. 9 double slip is similar in design, except that it has 18-ft. switch points curved from the end of the head planing to a radius of 859.93 ft. which is the outer rail radius of the connecting rail. Eighty-two tie plates and 84 adjustable braces were used for the standard slip.

We specified 1/8-in. pipe thimbles at the joint bolts for switch points and movable points, to prevent binding in throwing the points, but they were not satisfactory. Many of them were battered in installation and others failed in tightening the joint bolts, so the switch points were either loose and pounded or tight and bound. Also the cast anchor block was not adjustable and after four years' service some of the slips were getting in bad shape. For this reason one of the worst slips was changed last fall by installing 1/8-in. cast manganese thimbles, with the ends accurately ground to correct the length, changing the design of the large anchor block by making it in two parts with two tapered wedges slotted for bolting the parts together and with a fishing fit to the rails which

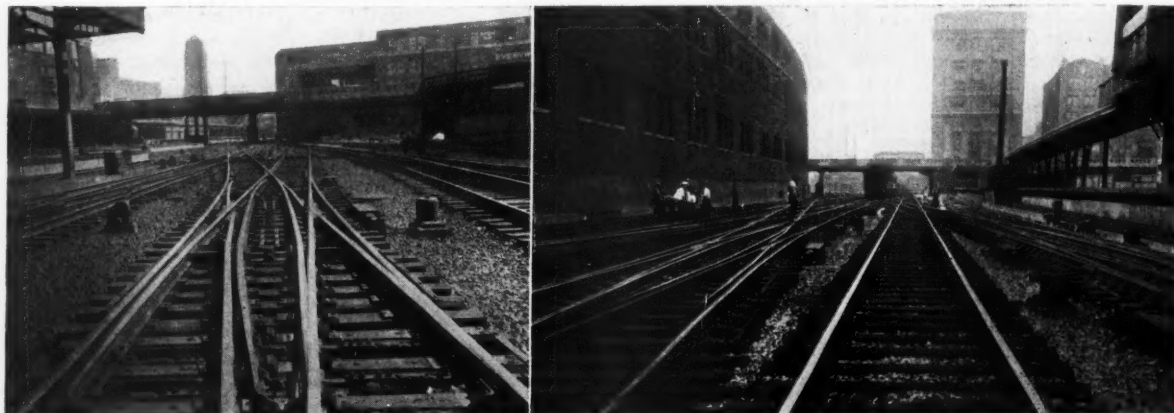
allows for future adjustment. The results were so satisfactory that we repaired several other slips in a similar manner, and today the slips and crossings that have had 5½ years' severe service are tight and in good working condition aside from natural wear. Of course, considerable credit for the good service obtained must be given to the concrete track slab and the heavy rail.

Some of the outstanding features of the double slips to be mentioned are as follows: They are of heavy construction—manufacturers advise that no other slips have

A yard or terminal is limited in its efficiency by the completeness of the interlocking system and to get the best results it is necessary to consider this very important item in every stage of the work. One of the requirements imposed was continuous track circuits throughout with dead sections not to exceed 5 ft. in length.

Insulation of the Joints an Essential Feature

The diamond crossings and end frogs of slips where it was necessary to provide the short guard rail were the



Two Views of the Double-Slip Construction

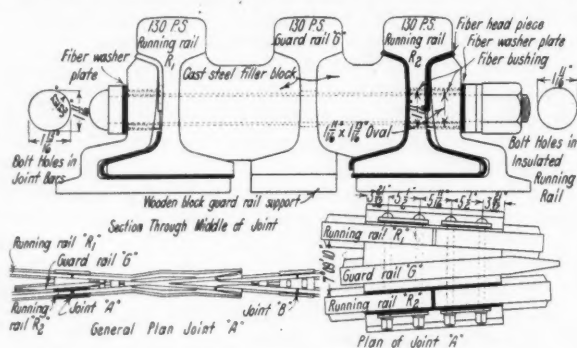
ever been built of as heavy material throughout. Extra precautions were taken for fastening the various parts firmly together and after 5½ years' service these slips show no creepage of points whatever. Complete provision was made for future interlocking—the ties were properly spaced and of the right length for installing the switch machines later, the throwing rods were insulated and baskets provided for switch machine connections, and the frogs were all provided with steel shims at joints which could later be removed and replaced by fiber insulation.

The points can be thrown with ease; the manganese thimbles used at the joint bolts allow the joint to be kept

most difficult to insulate and required the development of four special types of joints: Type "A", which insulated the frog ends where the short guard rail is used; Type "B", where the filler block only is used and is common to other frogs; Type "C", where the running rail and guard rail in diamond crossings are insulated; and Type "D", where the stock rail is attached to the solid manganese end of the crossing frog.

The special features of these insulated joints are the angle bars which are of the continuous type and made to extend the entire width of the base of rail instead of half the width as used in the standard joints. These joints have stood up exceedingly well, with practically no renewals of fiber since installed in August, 1923.

All slips and crossings were fully assembled at the shops and carefully inspected. Units which were to be a part of a crossover system were held to a maximum variation in overall dimensions of ⅛ in. The points were fully bolted and thrown by hand to test them for any possible binding, the plates were all assembled and properly fitted for the planing and adjustable braces. All parts were plainly marked for reassembling in the field.



Details of the Insulation for a Type "A" Joint

tight and at the same time permit free movement of the points. A very limited amount of maintenance is required. Practically no maintenance was given these slips for the first four years they were in use. The plates, braces, anchor blocks and other parts show practically no wear and will be used again when the new points and connecting rails are installed. The extra first cost has been paid for many times in the low maintenance, and the extra long service these slips are giving.



Winter Brings Troubles for the Maintenance Forces

Heating of Aggregates Necessary When Placing Concrete In Winter *

A Comparison of Methods to Be Followed When Carrying on Work at Extremely Low Temperatures

By A. M. BOUILLON

Engineering Department, Chicago Terminal Improvements, Illinois Central, Chicago.

THE IDEAL WAY of heating aggregates is by steam, providing this is properly applied and not overdone. However, steam can be incorrectly applied in heating aggregates as, for instance, by the use of steam pipes (usually perforated), laid on a platform and generally spaced 3 to 5 ft. apart, over which aggregate is dumped. Although this provides very uneven heating, one of the greatest objections is the fact that

gravel and sand over an old boiler or a piece of old smoke stack, or an old corrugated pipe, by piling the material on the top and sides. This results in concentrating the heat immediately at the top of the heater, thereby resulting in overheating the material directly over the top, and underheating most of the rest with no heat whatever for the outer layers of the pile.

A practice that might prove objectionable, if not also



Building a House for the Mixer, with Material Bins at the Left

the material first thawed is usually inaccessible, being directly over the pipes at the bottom of the pile where it cannot be shoveled out in rotation of delivery. As the material pile is replenished the new material is used first because the old material cannot be reached readily and when it is reached it is usually much hotter than it should be, whereas the material delivered later and therefore more accessible to the men may still contain frozen lumps. In some cases piles are covered with canvas and allowed to heat overnight. This results in more uniform but usually too severe heating, which is just as objectionable as underheating, as was confirmed by tests made on several jobs under the writer's supervision.

Another objectionable system of heating by steam is that of using steam jets, placed or moved at random in the pile of aggregates. The writer has seen frozen lumps and overheated gravel shoveled into the same measure, as a result of the use of this method.

There are also other objectionable methods of heating aggregates, such, for instance, as the cooking of

risky in case of unexpected severe weather, is that of not heating the aggregates at all but of depending upon hot water to thaw the materials while mixing. If the coarse aggregates run to fairly large size, as happens in mass concrete, the result will be insufficient heating of the coarser sizes to provide uniformity of temperature in the mass. If this attempt at economy is carried further by the use of half-way measures in heating the concrete after it is placed, this mixture may not stand even a moderate cold snap or a mild blizzard.

Heating Aggregates in Bins

The best way to heat aggregates is in chutes or bins with steam pipes placed on the bottom and the heating controlled by valves so that overheating can be avoided. The main advantage of the chutes is that they provide more uniform heating than is possible with other methods. Perforated steam pipes may be used for the purpose of allowing a moderate amount of steam to escape through the aggregate and thus act as a partial check against overheating but the best way to control heating is by the use of valves.

*This is the second of a series of articles on building bridge masonry in winter. The first article appeared on page 383 of the October issue.

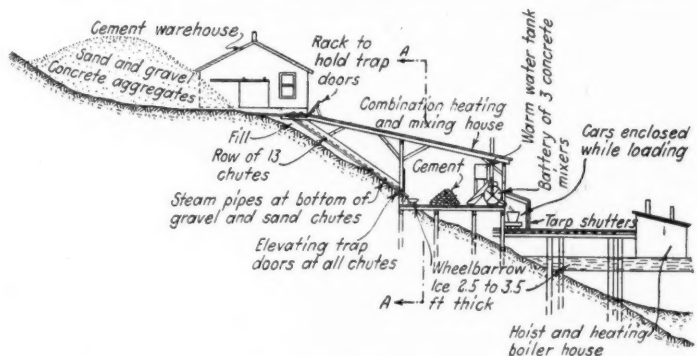
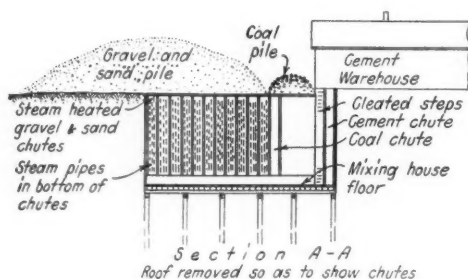
The most effective winter concrete plant ever seen by the writer was that used on the construction of the Clover Bar bridge on the Grand Trunk Pacific, near Edmonton, Alta. The bulk of the winter work done on this bridge was in three of the four river piers averaging about 145 ft. high, of which about 100 ft. was above ice level. The mass concrete quantities in each pier averaged around 4,300 cu. yd., the proportions used being 1-3-6 in the footings, and 1-2½-5 in the shaft, except the upper three feet which was 1-2-4.

This work had been taken over from the contractor by the railway company and after purchasing new equipment, was resumed early in October, and carried on day and night, except Sundays, until the last day of the following February. The system employed for heating concrete aggregates in the west heating plant, where most of the concrete placed on this job during that winter was mixed is shown in Fig. 1. It consisted of a combi-

ment, the chute for the cement connecting directly with the cement warehouse, also located on the upper bench. A 12-hp. boiler was used to supply the heating steam and the exhaust steam from the mixers was also utilized. Soft coal was used at an average cost of \$2.73 per ton delivered from a nearby mine, either to the bench facing the coal chute or on the ice at the various piers for use in the heating plants installed at the piers.

The Cost Was Not Large

The net cost of heating the aggregate detailed below includes the cost of constructing that portion of the combined mixing and heating house lying above the floor level, it being assumed that the floor and its foundation would have been required as a concrete platform if the work had been done during the summer, also certain deductions were made for planking that would have been required to provide a clean slide for the aggregates.



An Unusually Complete Mixing and Material Heating Plant

nation heating and mixing house built on the slope of a bank lying just below the bench on which the aggregates were piled and the cement warehouse was located. The floor was placed at an elevation that allowed direct pouring from the mixers into the buckets carried on push cars operating on narrow-gage double tracks between the mixing house and the piers. Advantage was taken of the topography of the ground in building 11 chutes for the delivery of aggregates to the mixers by gravity from the storage piles on the upper bench, the bottom of each chute being laid with steam coils to provide heating of the aggregates.

How the Bins Were Constructed

The required incline of these chutes to hold the gravel when the bottom trap door was closed without tending to bunch at the lower end, and also to insure free movement when the trap was opened, was developed through experiments with the aggregate. The chutes were about 36 in. wide by 16 in. deep and 24 ft. long. They were filled by shoveling into trap openings on the roof of the house which connected with the upper bench. The steam coils were made of 1¼ in. wrought pipe placed as close together as possible for the full length of the chutes, so as to provide uniform and rapid heating. Each coil was provided with shut-off valves to permit the regulation of the heat and prevent overheating. The aggregates, when heated, were measured into wheelbarrows, the flow being controlled by well balanced trap gates that were easy to manipulate. The chutes were emptied in rotation and refilled from above as soon as emptied. From 30 to 35 min. sufficed to heat a chute full of aggregate.

Separate but unheated chutes were provided for coal to supply the heating and mixer boilers and also for the

From this corrected cost was also deducted, the salvage obtained in the disposal of the materials and plant upon the completion of the job. The items below do not include the cost of heating the concrete after placing it in the piers, which will be covered in a later article.

Cost of Heating Aggregates per Cubic Yard of Concrete

| | |
|---|------------|
| Net proportionate cost of combined mixing and heating house | 4.61 cents |
| Net cost of heating plant | 3.02 " |
| Net cost of coal delivered | 2.17 " |
| Proportion of firemen's time and labor of cleaning boiler | 3.08 " |

Total cost of heating aggregates, per cubic yard of concrete 12.88 "

The wages prevailing at that time were 30 cents per hour for firemen, 28 to 32 cents for carpenters and 20 to 25 cents for laborers. The average cost of lumber delivered, of the grade used in this house, was \$30 per M ft., b. m. Two thicknesses of insulating paper were used on the outside of the walls and roof.

The total quantity of concrete on this job was about 24,000 cu. yd. of which about two-thirds was placed under winter conditions, including the quantity put in during the previous winter. Heating plants were operated on both sides of the river during the early part of the second winter, but the east plant was closed down as soon as work on pedestals on that side was completed. There was very little difference between the costs of heating the aggregates on the two sides of the river.

Large, quick-registering milk thermometers with easily read colored fluid were used to test the temperature of each batch of concrete and records were kept identifying the pier to which the batches were delivered. This information was of value primarily in providing a constant check on the heating and enabled corrections to be made

on the succeeding batches. The batches were one cubic yard each and two mixers of that capacity were in use with one held in reserve for breakdowns.

Another kind of heating plant for aggregates which was used on several other bridge jobs consisted of one or more bins of the type shown in Fig. 2. This type likewise furnished a satisfactory method for heating the aggregate because the means of heating were provided along the line of flow of the materials, the supply being replenished from the top. Outlet of the heated aggregates was also by gravity, but greater care was required in regulating the flow because of pressure exerted by the greater depth of contents than was the case in the plant previously described. Replenishment of aggregates could be made either with derrick, conveyer, truck or teams.

In certain cases where delivery from pits was at a higher level than the bins, replenishment could be effected either by chutes from some convenient storage place a few feet above the bins or unloaded on a platform level with the top of the bins and then shoveled in as required. Generally two bins were needed, but in some cases more, depending upon the requirements of the job and the capacity of the bins. Light weight bins of this type could also be built either on skids or wheels so that they could be moved to different parts of the job, as the requirements demanded and the nature of the ground would permit, such as on pedestals for viaducts, retaining walls, etc.

The Cost Will Vary with Local Conditions

The cost of heating aggregates in bins of the general type described above will vary considerably on various jobs due to differences in the local conditions, the quantity of aggregates to be heated and the number of moves required in proportion to the total yardage. On jobs

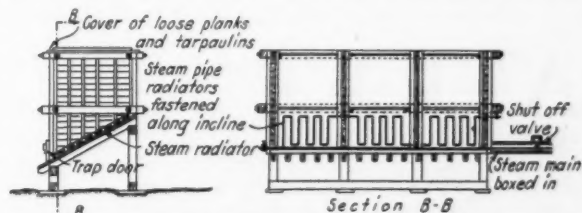


The Mixing Plant Was Located at the Foot of the Bank

requiring 8,000 to 10,000 cu. yd. or more of heated aggregates and comparatively few moves, as in the case of abutments, piers, large pedestals or heavy retaining walls, the cost in the period between 1908 and 1914 varied between 15 and 25 cents per cu. yd. of mixed aggregates, corresponding to an average present cost of 30 to 50 cents per cu. yd. On small jobs, or the kind that requires frequent moves with proportionately small yardage, the cost might easily rise to double the figures quoted. On the construction of several pedestal substructures for via-

ducts in western and eastern Canada, supervised by the writer, the coal cost \$8 to \$12 per ton, delivered or 5 to 6 cents per cu. yd. of heated mixed aggregates.

Where the work is scattered it is of great advantage to plan a flexible heating plant so that it can be dismantled and reset quickly. In some cases it may be necessary to provide a separate heating plant for each of the concreted units. The method of heating with stoves or salamanders, while often cheaper, should only be adopted as a last choice, because the dry heat resulting from the use of this method absorbs the moisture from the con-



A Unit Type Heating Plant

crete that is required in the process of curing. This results in a material lowering of the strength of the concrete and is particularly serious when the effect of the drying is not compensated for by some efficient system of curing. In addition, the use of stoves and salamanders greatly increases construction risks because the fire hazard is increased in proportion to the number of heating units employed. Inefficient, uneven and unstable heating is also likely to result from the use of such heating systems on larger jobs, particularly when no heaters are provided on the outside, or most exposed portion of the structure, thus creating uneven stresses before the concrete has set and before it has acquired proper resistance. Curing should, of course, be provided no matter what system of heating is used, but is particularly desirable with a dry heating system, if assurance of quality and strength are among the prime factors of the job, as should be the aim on all important work.

Use of Large Stones Is Objectionable

So-called pudding stones or plums (Cyclopean concrete) should not be placed in mass concrete during freezing weather because of the frost absorbed by such stones when exposed to the weather, the cost of rehandling and the resulting delay to the work if they are stored and heated. Experiments made with such stones that had been exposed to frost and dumped in warm concrete showed very poor adhesion with the concrete when set, due evidently to the great difference in temperature between the stones and the concrete which could not be overcome as fast as the concrete could set. The tests and field experiments made by the writer and his assistants emphasize the necessity of as nearly uniform temperatures of the various materials as is practically possible. Playing a steam jet on frozen pudding stones prior to dumping them in concrete merely gets the frost out of the surface and does not insure ultimate adhesion with the mass.

RAILROAD MEN IMPLICATED—Indictments against W. T. LaMoure, freight traffic manager of the Boston & Maine, and two employees of that road; an employee of the New York Central at Chicago; and an employee of the Chicago, Milwaukee & St. Paul at Chicago, were returned by a grand jury in the United States court at Chicago on November 18 on charges that they are members of an organization making and shipping liquor.

Building a Large Intake Pipe Line in Lake Michigan

Unusual Construction Required to Meet Wave Action and Settlement of Future Embankment

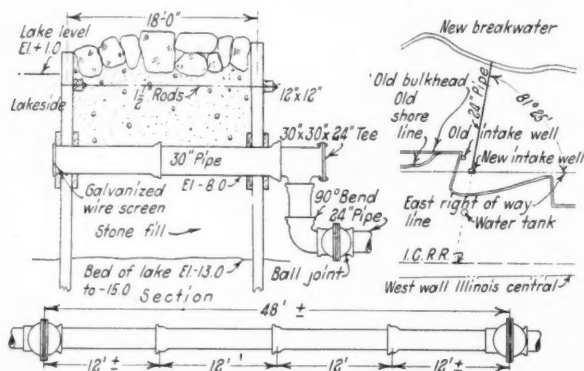
By C. R. KNOWLES

Superintendent Water Service, Illinois Central.

AN INTAKE LINE of unusual size and design has recently been constructed by the Illinois Central at its Twenty-Seventh street shops, Chicago. The water supply at this point is pumped from Lake Michigan and is used for locomotives, condensing engines, stationary boilers, and general shop purposes. The daily consumption for all purposes is from 2,500,000 to 3,000,000 gal.

Prior to the construction of the new intake line, water was secured through two smaller intake lines, 8 in. and 10 in. in diameter. As the consumption of water increased these lines were taxed beyond their capacity and could not furnish the required amount of water. This was particularly true during the peak demand which occurred during the early evening hours when the condensing engines used for generating electric current were being operated at or near full load. It was therefore necessary to purchase water from the City of Chicago and two city connections 6 in. and 10 in. in diameter

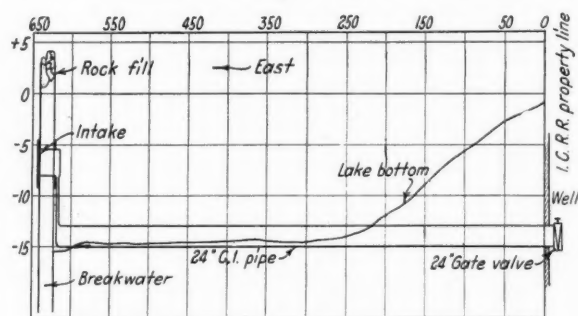
the proposed shore line will be filled in, forming a park. It was not desirable to locate the pumping station or any other structure on this ground. Therefore, it was necessary to construct the intake as a flow line discharging into a storage basin or intake well which is located on the railroad company's property near the old shore line.



Location Map and Details of Construction

were called upon to supply a large amount of the water used during the peak load. Considerable difficulty was also experienced in preventing the old intake lines from clogging up during storms on the lake or when in-shore winds prevailed, on account of the immense amount of material washed up in the shallow water where the lines were located. At such times it was necessary to have a crew of men constantly on duty to remove the debris from the intake well and to keep the intake lines open in order to avoid shutting down the pumps.

The construction of an intake of adequate size extending out in the lake sufficiently far so that trouble would not be encountered from storms had been under consideration for a number of years, but was held in abeyance until a decision was reached as to definite plans for the lake front improvements. The new line is 24 in. in diameter and is 650 ft. in length, extending from an intake well located at the old shore line to the new breakwater which forms the recently established shore line. That portion of the lake from the existing shore line to



Profile of the Intake Pipe Line

The intake well is constructed with two levels, the lower level forming the storage basin or intake well proper, while a reinforced concrete floor just above the water line, forms a pump room in the upper portion. By this arrangement it was possible to place the pumps below the surface of the ground in accordance with the desire of the park commissioners.

The shore near the location of the new intake well has a gentle slope, with a depth of 3 ft. of water at the intake well and reaching a maximum depth of 15 ft. at a point about 350 ft. from the shore line and continuing

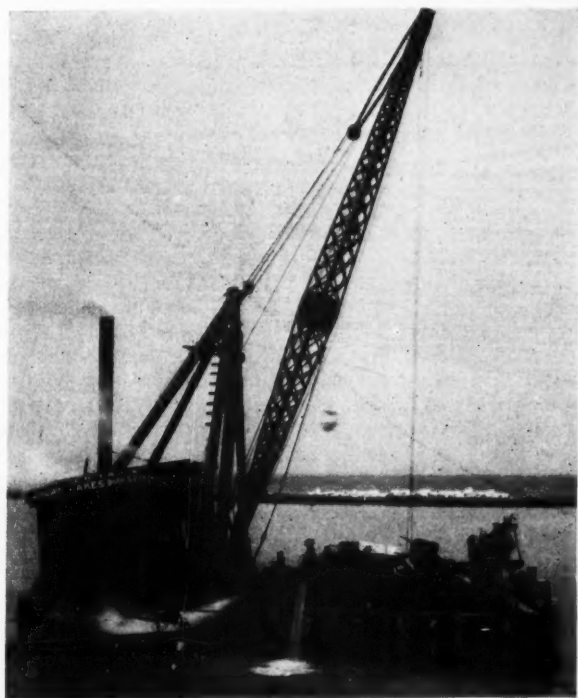


The Lake End of 30-in. Intake Pipe

at this depth to the breakwater. As the intake is designed as a flow line it is laid on the bottom of the lake, a trench being excavated from the intake well to a point where the maximum depth of water is found in order to maintain a level uniform bearing for the pipe. The line will eventually be covered with about 25 ft. of earth

when this section of the lake is filled and considerable study was given to the kind of pipe to be used. It was finally decided to use 24 in., Class "B" American Water Works Association standard bell and spigot cast iron pipe. It was realized that the pipe would be subjected to a certain amount of wave action and also to settlement after the fill is made; therefore, consideration was given to the use of flexible joints. After careful consideration of the various types of flexible joints it was decided to place a flexible ball joint of the so-called Ward type having a permissible deflection of about 10 deg. every 48 ft. which allows for both wave action and settlement without damage to the pipe and has the additional advantage of providing sufficient flexibility to permit the end of the last section laid to be raised above the water line for joining to the next section and lowering both sections to position on the lake bottom. All joints in the pipe line, including the ball joints, are made with lead.

The equipment used in laying the pipe was two pipe barges, a floating dredge for excavating the trench and a floating derrick for handling the pipe. The pipe was put together on the barges in 48-ft. sections of four joints, every section having a flexible ball joint at each



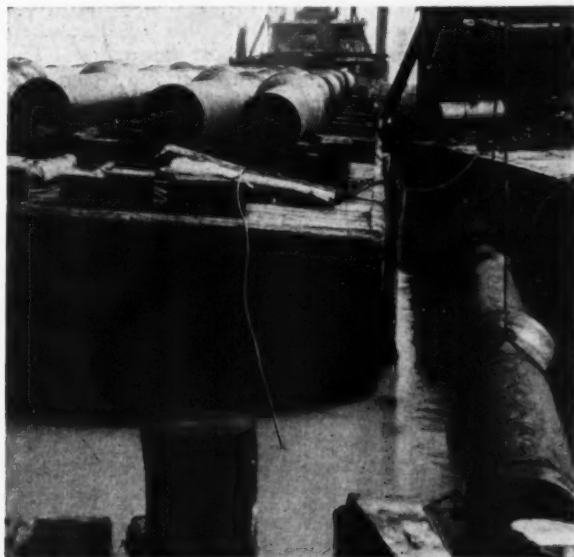
Excavating on the Site of the New Intake Well

end, the joints being poured and calked on the barges. The sections were then raised by the derrick and connected to the last section laid, all joints being made above water except where a connection is made to the intake well and to the screen. The utmost care was exercised in connecting the pipe to insure properly made joints and after lowering the pipe to the bed of the lake it was thoroughly inspected and leveled by a diver working from the floating equipment. The wisdom of this underwater inspection was apparent when one bell was found to be broken after the pipe was laid and was raised to the surface and replaced. The joints of the intake well and to the strainer at the outer end of the line were made under water by a diver, using lead wool to calk the joints. The flow of water through the intake line is

controlled by a 24-in. gate valve located just inside the wall of the intake well with the stem extending up into the pump room. In the event that it is desired to empty the intake well for the purpose of cleaning the well or making repairs to the suction line and foot valves, the valve may be closed and the water pumped out.

The pipe is increased to 30 in. in diameter where it passes through the breakwater and a galvanized wire screen with a 1-in. mesh placed over the end to exclude fish and other matter. The 30 in. pipe is raised 8 ft. from the bottom and connected to the 24 in. pipe with a short piece of 24 in. pipe and a 90 deg. bend looking up.

The increase from 24 in. to 30 in. is made by means of a 30 in. by 30 in. by 24 in. tee which is connected on



Lowering Three Sections of Pipe Into the Water

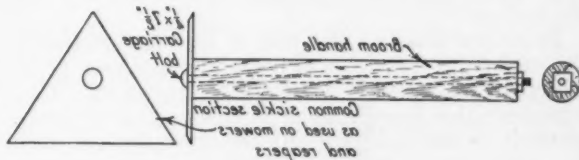
the rim of the 30 in. pipe. The shore side of the tee is closed with a blind flange which, by closing the opening to the lake, will permit of inspection of the line if so desired. The line was laid at the rate of 150 ft. per day at times, although the total time required to lay the pipe was about three weeks as the work was interrupted frequently by rough weather.

A Home Made Paint Scraper

By E. E. CLOTHIER

Chief Carpenter, Chicago, Milwaukee & St. Paul, Perry, Ia.

THE SKETCH shows a useful scraper for cleaning bridge steel preparatory to painting that can be made at small expense from one of the teeth of a mower or binder sickle. The tooth or section from the sickle



How to Make a Handy Scraper

should be provided with a one-quarter inch hole in the center. The handle consists of a piece of broom or spade handle 7 in. long through which a $\frac{1}{4}$ in. hole has

been drilled lengthwise, the handle and the knife being connected by means of a $\frac{1}{4}$ -in. by $7\frac{1}{2}$ -in. carriage bolt. After the knife has been ground on all three edges it is ready for use. The most essential tool for an iron bridge

crew is a good high-gear ed emery wheel for scraper^s like the one described above or any other must be kept sharp at all times if good results are to be obtained with it.

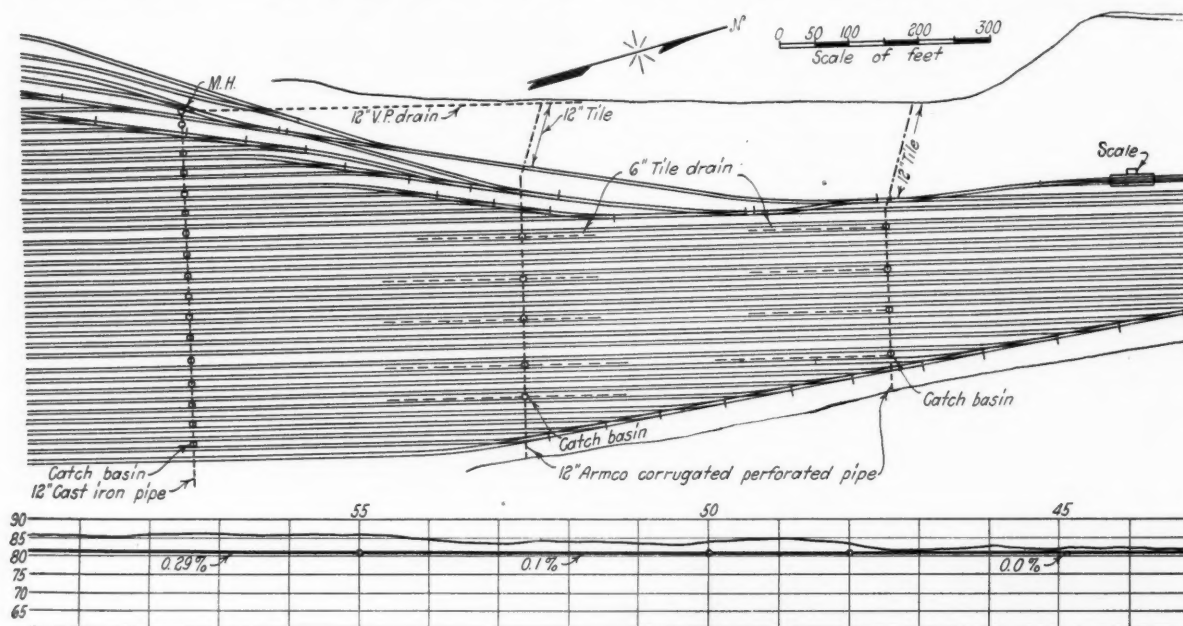
New Type of Pipe Solves Drainage Problem in Yard

ROADBED DRAINAGE is a problem of no small importance in the construction of railroad freight yards. If inadequate, wet areas will appear where it will be difficult to maintain the tracks at the proper grade and alignment. Especially is this the case when, as frequently happens, water stands at the surface. This may necessitate the closing of the tracks affected until the condition has been corrected.

While the best time to install drainage structures is, of course, when the yard is built, it is not always possible to foresee the extent of the facilities that must be pro-

per is constructed partly in a cut composed of yellow clay. Its longitudinal grade varies from level to 0.5 per cent, and it has a transverse slope of $7\frac{1}{2}$ in. per 100 ft. The 35 classification tracks are spaced alternately 13 and 15 feet center to center.

The yard was put into operation in September, 1924, during a comparatively dry season which provided no opportunity for the study of drainage. In the wet period of the spring of 1925, however, it was found that a number of tracks in the north end of the yard were under water at the foot of the 0.5 per cent grade. Ap-



How the Drains Were Located in the Yard

vided. Indeed, the construction of the yard itself may create a subsoil condition calling for more drainage than would be indicated by a survey of the original ground surface. Particularly is this the case when the yard is built partly or entirely in a cut for the reason that previously existing avenues of drainage may be closed and new outlets opened for the escape of subsoil water onto the surface.

In the new Toledo, Ohio, yard of the Michigan Central the subject of drainage was brought to attention of the officers by the unusually wet condition last spring. Their experience then brought about an investigation of various methods of yard drainage with the result that the facilities which have now been provided are of such a nature that it is felt that the yard has been adequately equipped and is safe against any interruption due to drainage.

This yard, of 4,000 cars capacity, was built in 1924. Details of its design and construction were described in *Railway Age* for June 20, 1925. The classification yard

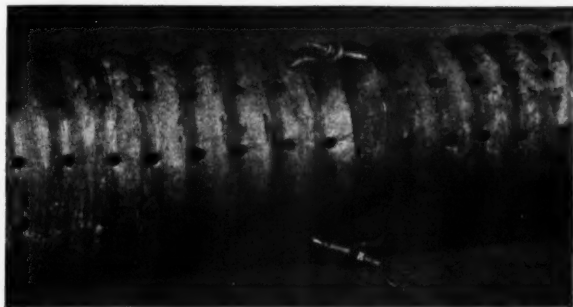
parently the compacted clay soil of which the roadbed was constructed prevented the escape of surface water which accumulated at the foot of the grade to such an extent that some of the tracks had to be taken out of service temporarily. As the yard was not as yet fully occupied, the time was opportune for correcting a condition which later might easily have caused serious interference with traffic.

After careful consideration, a series of additional roadbed subdrains were decided upon as best suited to remedy the conditions noted. By supplying the soil with its one lacking quality, porosity, these subdrains would remove surface water as soon as it appeared and collect it at a point from which it could be carried at once to a drainage channel outside the yard. The accompanying plan shows the arrangement of these drains with respect to the track layout.

In August, 1924, before the plant had been placed in operation, a cast iron pipe had been laid across the yard,

2,400 ft. from the north end. To this line were now added two others parallel to the first and 530 and 1,060 ft., respectively, north of it. On each line was installed a catch basin in the 15-ft. space between every second pair of tracks. To these catch basins were connected, also, longitudinal drains running parallel to the track, 150 ft. apart in each direction.

In selecting the materials for the main transverse drainage lines, consideration was taken of the fact that these



Adjoining Sections of the Pipe Were Connected by Means of Hook Bolts

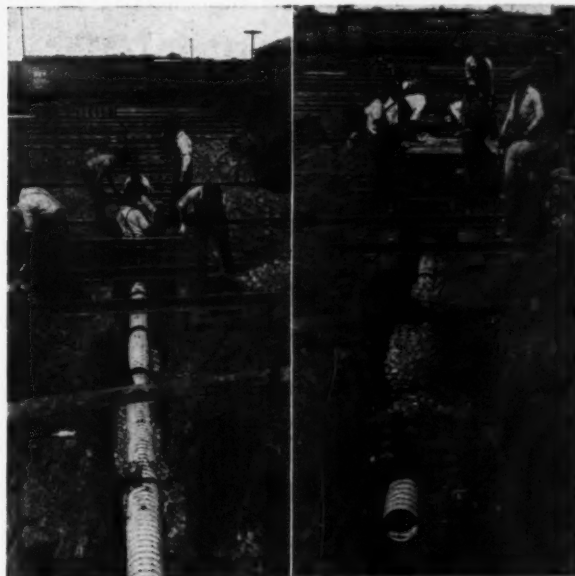
drains would be subjected to the pressure of heavily loaded tracks, and that failure of the drains might have serious consequences from an operating standpoint when the yard was fully occupied. The material chosen must, therefore, be immune to breakage by traffic, soil, or temperature conditions, or any other cause.

Investigation disclosed that a type of drain had recently been placed on the market which seemed well adapted to meet the requirements imposed. This was a corrugated iron pipe, perforated with $\frac{5}{8}$ -in. holes spaced 4 in. center to center throughout two-thirds of its circumference. This pipe was developed by the Armco Culvert & Flume Manufacturers Association.

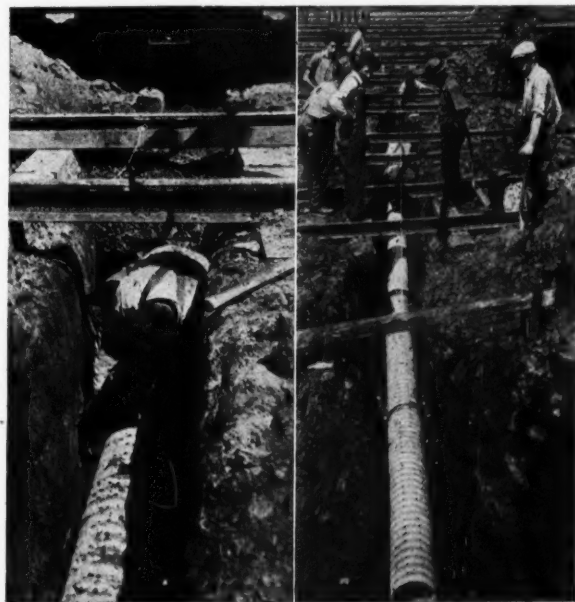
For the transverse drains, therefore, 12-in. Armco perforated pipe was selected. These lines were laid at an average depth of four feet below the top of the rail and on 0.5 per cent grades, descending outward each way from a summit in the center of the yard. The pipe was

supplied in 12-ft. sections, which, when placed in the trench, were joined together with two hook-bolts. Individual sections weighed only about 130 lb. and were easily handled by two men. The trench was of uniform cross-section throughout, as no additional excavation was required for the joints, the bolts for connecting adjoining sections of pipe being within easy reach of the top of the pipe. When the pipe had been lowered into the trench and connected, it was brought to exact grade by blocking to conform to required measurements from a chalk-line stretched between two grade boards. This made unnecessary any refinement in the excavation of the trench. The space around the pipe and for six inches above was filled with broken stone, the remainder of the trench being filled with cinders.

The catch basins placed in the 15-ft. spaces between alternate pairs of tracks were constructed of brick on concrete foundations and were equipped with iron grat-



The Trench Was Backfilled With Stone to a Level Six Inches Above the Top of the Pipe, the Remainder With Cinders



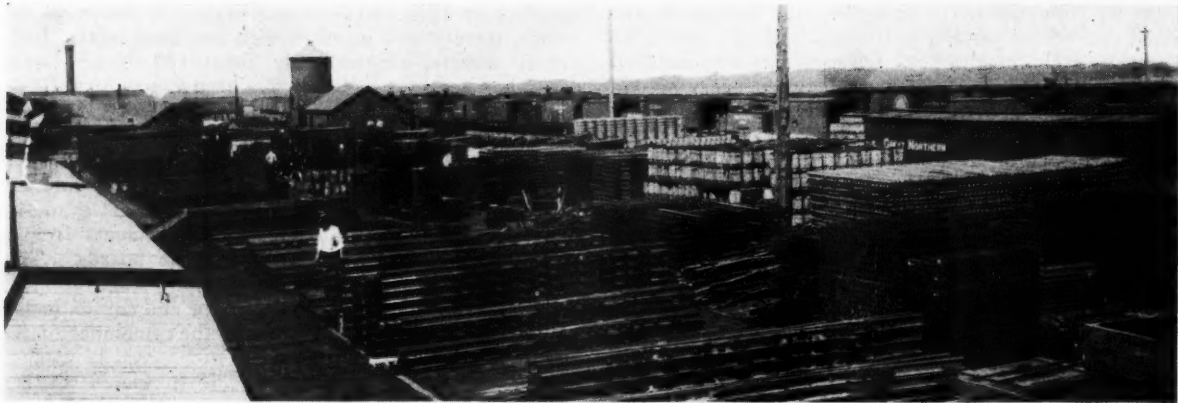
After the Sections Had Been Connected the Pipe Was Brought to Grade With the Aid of Chalk Line

ing covers. The longitudinal drain lines between the tracks were built of 6-in. vitrified clay tile, laid with open joints.

All work incident to the placing of these drainage units, including excavating, backfilling, and removing surplus materials, was done by a gang of 12 men. This gang laid an average of about 100 ft. of pipe per day, making the labor cost of installing approximately 48 cents per foot. All excavated material was placed between tracks, thus avoiding any interruption of traffic.

Since the completion of this system of roadside drainage, rains of only normal intensity have occurred. At all times, however, the yard has been dry and at no time has water stood at the surface after a rain. This indicates the effectiveness of the drains in removing the surface water as soon as it appears. While it is felt that the classification yard has now been adequately equipped, a similar improvement will be incorporated in the receiving yard in the near future.

The work was done by company forces under the general direction of H. J. Payne, engineer in immediate charge of the work. Helpful advice in planning and executing the project was given by A. W. Spaulding, engineer of the Armco Culvert & Flume Manufacturers Association, Middletown, Ohio.



A Well Arranged Stores Department Yard

How is The Storekeeper Treating You?*

Some Helpful Suggestions from One of Them on Methods That Will Insure Better Service

By J. G. STUART

General Storekeeper, Chicago, Burlington & Quincy, Chicago.

MATERIAL and supplies comprise one of the big factors in maintenance of way work, for without material and supplies good plans or improved methods cannot be effective. Therefore, it is well that those in charge of maintenance of way work should occasionally discuss the question of material and supplies so that they will not, so far as is possible, be handicapped by a lack of material.

It might seem that a store department man would speak from a storekeeper's viewpoint, but I am going to talk to you as if I were a maintenance of way man and, knowing the store end of the business as I do, I am going to speak of the things that will enable the maintenance of way man to get better service from his storekeeper. You notice I say *his* storekeeper, for if a roadmaster or maintenance of way man does not look upon the storekeeper as *his* storekeeper, it is quite likely that there is something lacking in their relations. When a maintenance of way man speaks of the superintendent it is as *my* superintendent; when he speaks of his division it is *my* division. Why should he not speak of the storekeeper as *my* storekeeper? The store department is organized to specialize in the furnishing of supplies and material and thus relieve the other departments of this burden. The storekeeper is there to render this service and if I were a maintenance of way man I would do everything I could to get the best service possible. There is no doubt but that the service given by the storekeeper becomes a large factor in the service which the maintenance of way man gives. If he can get better service from the storekeeper he can give better service himself. Do not forget that the storekeeper is there to serve you and if you do not get your full share of that service, in most cases it is your own fault.

Effective Stores Service Is Essential

The man doing the job can do much better work when he receives the right material when he wants it than he can when the material is delayed or the wrong material

is received, and that difference is usually made up by a good storekeeper who has an understanding of the conditions under which the maintenance of way man is working. You are entitled to this service and should get it. But did you ever stop to reason out just what it means to give this service, or what you could do to help make it possible?

There is a great deal in supplying the maintenance of way material for a railroad that does not always appear on the surface. To a great many it seems to be just a question of going to the pile and loading the material on the car, but have you ever stopped to think how it got into the pile? It surely did not grow there. It has no legs—it did not walk there. Before it got into the pile somebody had to visualize your future requirements and order the material. Then it was necessary for the purchasing agent to place an order for it with some manufacturer and quite likely the manufacturer had to make it after he received the order, for in many instances the maintenance of way material is peculiar to the road using it. So it is not unusual that from two to six months will elapse from the time the storekeeper makes the order until the material is in the pile.

Have you ever thought how difficult it must be for the storekeeper to estimate what you are going to use several months in advance? Have you ever thought how much you might help him to do this? Have you ever talked to him about your work—told him what you were planning and what material would be needed? Have you ever told him of some items you expected to use in larger quantities so that he could build up his stock, or of some items of which you would use a smaller quantity so that he would avoid ordering material that would not be needed? If you have not, don't you think you could help him if you would talk it over? Remember that when you help him you are really helping yourself. Don't forget that one of the biggest things in maintenance of way work is getting material into the pile. It is an easy matter to ship it out if the storekeeper has it. There is, perhaps, a tendency on the part of the maintenance of way man to emphasize what the storekeeper

*From a paper presented before the Maintenance of Way Club of Chicago on November 18, 1925.

should do for them, but I think they should constantly keep in mind what they can do for themselves and what they can do for the storekeeper.

How Much Thought Do You Give in Making Requisitions?

There is another way in which the maintenance of way man can help himself—something that is right in his own hands and something that means a great deal more than might appear at first glance. You get your material by making requisitions. Have you ever given the subject of making requisitions very much thought? Have you ever thought of the making of requisitions as something that had a great deal of bearing on the getting of material? To make these requisitions right and to make them on time is one thing that enables the storekeeper to give you far better service. Making requisitions is so simple that it hardly seems necessary to speak of it but it is not so simple as it might seem and it is worth discussing.

Improperly prepared requisitions are one of his greatest troubles and this trouble, like a great many others that the storekeeper has, is passed on to the other fellow—in this case, to the maintenance of way man. But although this causes so much trouble, it can be very easily overcome if just a little attention is given. The first move in getting right material is to make right requisitions. Make them right and save this trouble. When you make them right you avoid the delay which is necessary if the storekeeper has to ask questions before making the shipment.

Too often requisitions are not definite—they are not many sections of 75-lb. or any other weights of rail have in furnishing material, and which in most cases is fully known to the maker, is omitted. For example: How many sections of 75-lb. or any other weights of rail have you? Do they all take the same angle bar? Are the track bolts for this section all of the same diameter and the same length? Do all of the track bolts have the same kind of head or are some square head and some button head? If these conditions exist on your road are you always careful to see that the requisitions specify clearly just which angle bar or which track bolt is wanted or do your requisitions often read "three kegs of one-inch track bolts," when you know there are three or four different kinds of one-inch track bolts? Do you want the storekeeper to guess what you already know or would you prefer to have him hold up the requisitions and write you to ask for the information which might have been so easily shown in the first place?

He Must Either Guess or Ask for More Information

If the requisition is not properly made out the storekeeper will do one of these two. If he guesses and sends you the wrong bolts you will think he should have known better. If he writes you and delays the requisition you will most likely object on account of the delay. When your superior officer asks you for an explanation you may blame it on the storekeeper, and you may even convince him that some one else is to blame, but just remember that putting the blame on others doesn't get your work done and, regardless of who is to blame or who may be held responsible for the delay, the one outstanding fact is that you are held responsible for getting it done.

You may protest, of course, and say that you supposed the storekeeper knew what kind of bolts you needed, but please remember that, even if he is familiar with your conditions, the storekeeper does not do all the shipping and the foreman who actually loads out your material may know nothing whatever of your needs.

Bear in mind that even though the storekeeper does know a great deal about the conditions in your territory and the rail you have in track, he is only expected to know what you show on your requisition. Keep in mind that the quickest way to get material is to make requisitions correctly.

The maintenance of way man, is, of course, interested in the prompt filling of his requisitions; therefore, he should take interest enough to see that his requisitions are handled promptly. He makes a requisition today and figures that the storekeeper will have it the next day and should be able to ship the material a day or two later. But does he know that the storekeeper gets the requisition the next day? Does he know how long it takes to get it through the division engineer's or the superintendent's office? Does he realize that if the requisition is not made out correctly the approving officer may have to send it back or delay it to ask questions? He must understand that a day's delay before the storekeeper gets the requisition is just as long as a day's delay after the storekeeper gets it. It is to your interest to see that, once a requisition is made out, it keeps moving and reaches the storekeeper without unnecessary delay. The storekeeper can only be charged with the requisition after he has received it and not from the date it was made out or while it was lying in some other person's office.

How Is the Material Loaded?

How does the storekeeper ship you material? Is it loaded so that you can unload it to the best advantage and at the lowest cost? Generally you will find the storekeeper is up-to-date in handling material and that his facilities are good, but keep in mind that his organization and his facilities are built up with the idea of doing the work economically in his yard. He does not know the conditions at the unloading point. He does not understand your difficulties. If you are laying second-hand steel and want the worn side out, does the storekeeper load it so that when you unload it it is right to be put in track, or is it necessary to have your gang pick it up and turn it end for end? If the rail is coming in short lengths are they loaded so when you roll them off the car the pairs are together, or is it necessary for you to rehandle them in order to get them into pairs? If a turnout is ordered, does it all come in one shipment or are some parts missing which practically makes the whole thing useless until the missing parts are received? This makes it necessary to have two cars set and the men sent twice to unload when all of it could have been easily unloaded at one time.

When switch ties are shipped out are they loaded in station order so that each section can unload what belongs to it without unnecessary handling? When material for several sections is loaded on one car, is it put on so that each consignee can take out his own material without having to handle any that is consigned to others? When heavy materials, such as concrete bridge slabs, which require the wrecker or other derrick power to unload them and also require the same derrick power to set them in place, are ordered, are they shipped by the storekeeper when they are ready or are they held by him until you are ready to set them in place and thus avoid sending the wrecker twice when one trip would be sufficient? Is piling shipped whenever requisitions are received, which means extra unloading, or is a schedule furnished which enables the storekeeper to load out the piling so that it reaches the bridge just ahead of the pile driver?

All of these are matters which mean time and expense to the maintenance of way man, a great deal of which may be saved if the loading is properly done. Does the

storekeeper know the extra expense you are having? Did you ever talk it over with him or did you just suppose that he ought to know all about it? Even if he already knows about it, it would not hurt you to talk with him and quite likely through your talk you would be better acquainted.

Talk It Over With the Storekeeper

The next time you get a shipment that is not right, or that in any way causes you extra time or expense to unload, just send a note to the storekeeper telling him about it. Be sure to give him the car number and the date and number of the requisition so that he can locate the right shipment and also locate the foreman who loaded it. Tell him just how inconvenient it was for you and the extra expense incurred. Do not send it in as a kick, but say that you know he will be pleased to help you if he understands about it and so you are just letting him know. Be sure to tell him just how you would like to have the material loaded so that he may get your idea. If it is possible, it would be much better if you would go to see him and talk it over with him. Make your troubles clear to him. Explain to him that in many cases he can help you and possibly help himself—at least he may help you without any additional cost to himself. Also try to make it clear to him that even if it should cost a little more to handle it as you would like it, you could save a great deal more than he will have to spend and that this would represent a net saving to the railroad. Try to have him understand that you are on the firing line and that in many cases, time is a matter of great importance to you—much more than it is to him—that many things can be done to better advantage in a material yard where there is plenty of room than can be done out on some bridge or on some narrow fill or perhaps on some line where a great many trains are passing. Try to get him interested in your work and working for you. A little getting together and a little better understanding will bring better results. You are only helping the storekeeper so he can help you. Whatever you can get the storekeeper to do that helps you is just clear gain for you and for the road.

Show an Interest in His Problems

Another thing—if you want the storekeeper to be interested in your work so that he may help you, it would be a good thing for you to show an interest in the storekeeper's work. Look into his methods of handling and caring for the material that you use—not in a dictatorial way—but in such a way as to show him that you are really interested in what he is doing. Quite likely your experience in handling this class of material is such as will enable you to help him. Possibly you can give him some ideas which will enable him to make improvement in the appearance of his yard and in his methods of handling materials. Keep in mind that while it may seem that he is getting the benefit of your suggestions, in reality you are the one that is getting the benefit. Remember that whatever the storekeeper spends in handling the material you use is, in the long run, charged to the work you are doing and so enters into its cost. If you can work out a cheaper method it reduces your cost. You pay the bill; you should be interested.

Possibly some are thinking that I want the maintenance of way men to make all of the advances, to do all the co-operating, to do all of the running after the storekeeper. That is entirely wrong. I have no such idea; in fact, I think just the opposite. The storekeeper realizes that the maintenance of way man is one of his best customers and every good storekeeper endeavors to look after his customers in the best possible way, but if I

were a maintenance of way man I would cultivate the storekeeper so that I would have friendly relations with him. I would feel that I wanted my full share of the service that the storekeeper was there to give and I would not let anything stand in my way until I did get it.

The Branch Line Section Foreman

By J. B. KELLY

General Roadmaster, Minneapolis, St. Paul and Sault Ste. Marie, Minneapolis, Minn.

THE SILENT partner in the track maintenance department is the branch line section foreman who is seldom mentioned openly in contrast with the main track foreman or the employee on the part of the line where the heavy expenditures are made. This is natural to a certain degree and the result is that attention is directed to the main line foreman, who gets considerably more real assistance, while his co-worker on the branch is almost forgotten. Nevertheless he is an employee of great responsibility in many ways. He must shoulder more than his share of retrenchment. Since these auxiliary lines may not be abandoned, the ingenuity of the foreman, with his long section, disappointments with bad conditions due to unfavorable weather, etc., making track conditions next to impossible, is unconsciously relied upon to maintain traffic.

The type of foreman found on such sections does not hesitate to apply his strength in trying circumstances, but he also applies ingenuity and invariably gets results. In the shortage of help through limitation of expenditures or inability to hire men, he takes his motor car, track jack and shovel and not only restores broken-down spots in track to meet the requirement of safety but effects a smoothening in a thoughtful way by placing his jack so that the improper alignment is corrected at the same time, which is merely an example of results where there is co-ordination of might and mind. With the able assistance of his roadmaster who is thoroughly familiar with the details of this class of work, he also perfects and operates machinery such as power mowers, weed cutters and other labor saving devices.

Must Act as the Railroad's Representative

In the absence of the many employees necessary to represent the various departments, the branch line foreman deals with a road's neighbors and patrons, the farmers, who in most branch line locations are just as numerous and have as many needs as on the main lines. He knows the adjacent land owners or farmers by name, knows their crop and the general details of their farms and when the varied disagreements creep in that may make a bad impression or lead to an extensive claim, the foreman takes the responsibility of patching up the difference. He also gets the protection of plowed fire breaks, snow fence privileges off the right-of-way and even some team work at grading crossings, ditching, etc., in return for old ties.

Therefore the branch line foreman's problem is peculiarly different and the field for initiative is boundless, but if he falls into the rut of acting only as he is forced by supervision, instead of through interest, initiative and friendly rivalry, we are going to miss his effectiveness. For a long time his service has been a marked contribution to the operation of the railways as a whole and the importance of his position to the railroad which employs him cannot be over-estimated.

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Pennsylvania Uses Vacuum Cleaner on Stone Ballast

This Machine Removes Dirt and Cinders from Track at the Rate of 0.6 Miles Per Day

THE ADAPTATION of the vacuum cleaner to the removal of dirt from stone ballast is a novel development which has been made on the Eastern lines of the Pennsylvania. This cleaner, which has been in operation on the Philadelphia division of this road all of the past summer, has sucked, cleaned and returned the ballast to the track continuously at the rate of 33-ft. rail length every three minutes and at an average rate of about 0.6 mile per day of 10 hours. This machine is the result of more than five year's study and development.

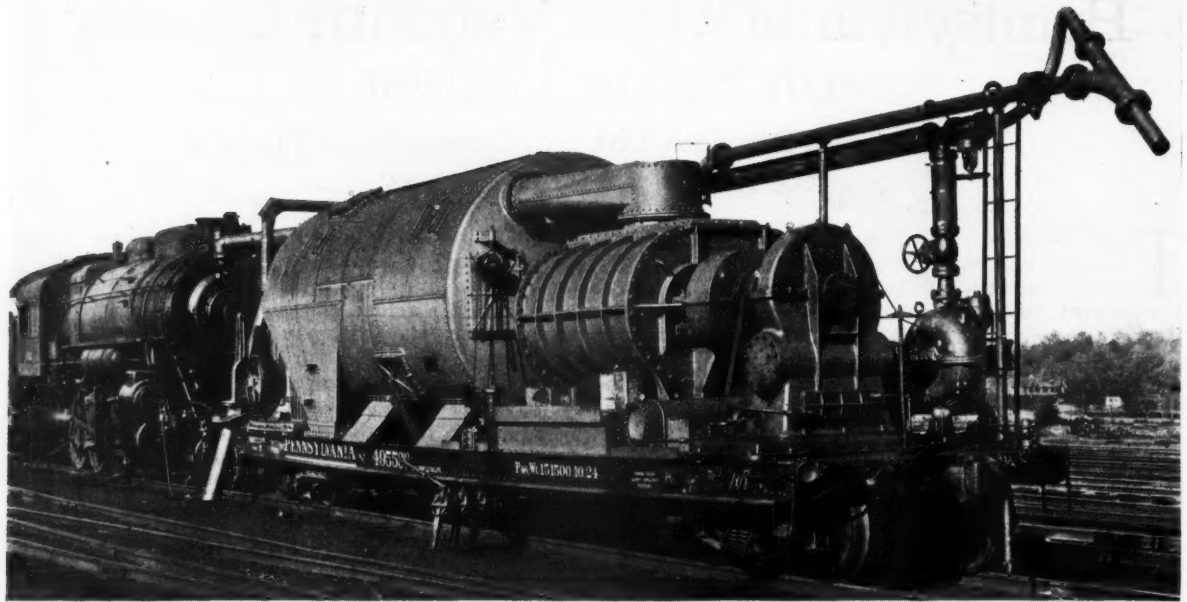
While the principle on which the cleaner works is simple, the adaptation of the vacuum system to the practical cleaning of stone ballasted track calls for very careful study of the requirements and design of the machinery to obtain the desired capacities and keep the machine within the limits of clearance and weight. A partial vacuum is obtained in a large tank by means of a fan driven by a steam turbine. The tank is divided from top to bottom by a screen set on an angle of about 45 deg., against which the ballast and dirt are thrown. The refuse passing through the screen falls to the bottom of the tank and the velocity of the air is reduced through expansion in the cham-

ber or tank. Baffle plates are arranged over the exhaust orifice to prevent refuse from being drawn through the opening. A flexible armored hose extends into the refuse end of the tank through which the finely screened dirt may be sucked and blown into an ordinary car at the rear of the cleaner. Power for the steam siphon or blower is furnished by a locomotive. The screened ballast falls to the bottom of the tank in the forward quarter where it is caught in small hoppers and passed through revolving valves back to the track within seven feet of the point from which it was taken.

Three intake or suction pipes extend horizontally forward from the end of the tank with telescopic joints and bend from a horizontal to a vertical plane beyond the end of the car in the working position. The vertical section of these pipes is telescopic to permit raising and lowering them by means of wheels and worm gear. One of these pipes works between the rails on which the equipment moves, operating across the track from rail to rail and picking up the loose ballast and dirt as it moves. The other two pipes work outside the running rails on either side and move alternately toward and away from the rail, sucking the ballast



The Forward End of the Machine Showing the Three Suction Pipes



The Vacuum Cleaner as Seen from the Rear

and dirt from the inter-track space as far as the mid point between adjacent tracks.

Steam for the operation of this equipment is furnished by a road locomotive through Barco flexible joints connected to the steam turbine which drives the fan to exhaust air from a large expansion tank. Steam is also used in the small engine on the front end to drive the valve mechanism through which ballast is returned to the track. A two-horsepower electric motor, taking current from a generator driven by a small engine on the front end, is employed to move the bed-plate on which the suction pipes are mounted. In the non-working position a regular M. C. B. coupler can be used, but when the bed-plate carrying the pipe is run out into the working position a wire cable passing through two snatch blocks on the locomotive pilot is used. The ends of this cable are fastened to a drum driven by a motor which winds up the cable and moves the cleaner to the locomotive. The drum is then released, the locomotive moved back about 15 ft. and the cleaner drawn forward as the ballast is lifted and cleaned. At times it is desirable to clean only the inter-track spaces or the shoulders, under which conditions the center pipe which oscillates between the rails is held in the raised position so that only the two side pipes are operating. When working in this manner the cable is not used, but a special coupler about four feet in length is substituted so that the locomotive can be coupled direct to the cleaner and move it slowly as the cleaning progresses. The car on which the cleaner is mounted is equipped with a plow arrangement consisting of a swinging horizontal arm which can be locked under the car or extended over the inter-track space and from which steel teeth project into the ballast to be plowed or loosened preparatory to cleaning.

This equipment was designed and built by the Sims Pneumatic Conveyor Company, Philadelphia, Pa., and has been in operation all of the past summer. We are indebted to J. B. Baker, engineer maintenance of way of the Eastern Pennsylvania division of the Pennsylvania, with headquarters at Harrisburg, Pa., under whose supervision the machine has been operated, for the above information.

Railroads Make Track Awards

IN ACCORDANCE with the practice of previous years a number of the railroads have awarded prizes to supervisors and section foremen whose tracks were given the best markings on their respective divisions or subdivisions in the annual track inspections. Thus far the results of these inspections are available from the Pennsylvania, the Norfolk & Western and the Southern, and an account of the awards on these three roads is given below.

Prize Awards on the Pennsylvania

On the Eastern region of the Pennsylvania, the principal prize of \$1,200 for the best line and surface on the main line between New York and Altoona and between Philadelphia and Washington was awarded to the subdivision with headquarters at Middletown, Pa., \$800 of this amount being given to A. E. Preble, supervisor, and \$400 to Wesley de Valinger, assistant supervisor. The prize for greatest improvement in line and surface on these lines was awarded to the subdivision with headquarters at Huntingdon, Pa., \$700 going to J. D. Lovell, supervisor, and \$300 to R. H. Crew, assistant supervisor. In addition, prizes of \$600 for the supervisor and \$200 for the assistant supervisor were given to the subdivision having the best line and surface on three main line superintendent's divisions. These prizes were received by L. St. C. Pie, supervisor, and David Davis, Jr., assistant supervisor at New Brunswick, N. J.; C. S. Hager, supervisor, and J. A. Robeson, assistant supervisor, with headquarters at Newport, Pa.; and E. L. Koch, supervisor, and H. S. Bamberger, assistant supervisor, with headquarters at Chester, Pa.

In the Central region prizes were awarded as follows: F. L. Shea, supervisor, \$800, and C. H. Frick, assistant supervisor, \$400, both with headquarters at Derry, Pa.; F. H. Bentley, supervisor at Wooster, Ohio, \$600, and J. C. Dayton, supervisor at Newcomerstown, Ohio, \$600. In addition to the above, \$100 prizes were awarded to the following branch line supervisors; C. G. Grove, Warren, Pa.; M. J. Jones, Titusville, Pa.; W. G. Kem-

merer, Emporium, Pa.; James Foley, Wheeling, W. Va.; C. T. Bishop, Ravenna, Ohio; C. H. Comstock, Mahoningtown, Pa.; M. J. Bray, Orrville, Ohio; F. H. Rothe, Pittsburgh, Pa.; S. E. Stewart, Verona, Pa., and G. F. Mathey, Monongahela City, Pa. On the Western region a prize of \$500 was awarded to T. Binkley, Jr., supervisor at Xenia, Ohio; a prize of \$350 to M. E. Boyle, supervisor at Greenville, Ill.; and a prize of \$200 to E. B. Kirchner, supervisor at Van Wert, Ohio.

Eighty-Three Foremen Receive Prizes on N. & W.

The Norfolk & Western has awarded first, second, third and fourth prizes of \$40, \$30, \$20 and \$10, respectively, for excellent track maintenance on the various supervisor's subdivisions. On 19 subdivisions the full award of first, second, third and fourth prizes was made and in addition two first prizes and five second prizes were awarded to meet special conditions on branch lines and in terminals. These prizes were awarded on the basis of markings covering line, surface, switches, frogs,

road crossings, ditches, roadbeds, right of way, station grounds and fences.

Southern Awards 50 Motor Cars and \$1,840 in Cash

As a result of the annual track inspection on the Southern 171 foremen in the track and bridge and building departments of the Southern were awarded prizes. As in previous years the plan is to award a motor car to the section foreman or bridge and building foreman whose work receives the highest marking in each supervisor's territory. If he already has a motor car he is given instead a \$20 gold piece and the motor car is awarded to the man second on the list, and if this man also has a motor car he receives a \$10 gold piece and the motor car goes to the third man. As this plan has been in effect since 1920 a considerable number of the foremen already have motor cars. Consequently more of the men this year received money prizes than cars, there being 63 prizes of \$20 gold pieces, 58 of \$10 gold pieces, and 50 motor cars.

Laying Rail in The Winter

THE GROUPING of maintenance of way work into three major subdivisions and the laying of rail in the winter were recommended in a report presented to the Metropolitan Track Supervisors Club, New York, at a meeting on November 14. The report was presented by G. H. Stewart (supervisor, Pa., North Philadelphia, Pa.), chairman of the committee and is abstracted below.

On some railroads money for new rail is not "funded" or handled as an "arbitrary," but is allotted in proportion to current earnings. This results in new rail being furnished at the time of the year when traffic is the heaviest and when it can be laid least economically. For such roads no reasonable percentage of rail allotment can be determined. For the best and most economical track maintenance it is absolutely essential that rail, ties and ballast be carried in "arbitrary" accounts in order that the supervisors can plan this year's work to fit the needs of their subdivisions.

A Uniform Force of Great Advantage

Another essential in economical track maintenance is that the force should be kept as nearly constant as possible throughout the year. The present practice, however, is to build up a large summer force by employing extra gangs and increasing the size of the regular gangs. In the fall, as a rule, these extra men are laid off and the tracks maintained through the winter with as small a force as possible. This extra force in most cases is made up of men with little or no experience in track work and the character of the work performed by them is almost entirely dependent on the ability of the foreman. A large percentage of these extra men are employed in gangs with old experienced trackmen and all are paid the same rate, resulting in reducing the efficiency and lowering the morale of the regular force. In this climate, there are few days or weeks in the year during which some real track work can not be done due to weather conditions.

Under the present practice a considerable additional force must be obtained or contracted for to remove snow and ice during snow storms and extremely cold weather. This additional force is always markedly inefficient, the work of one regular trackman being in many cases equal to that of eight or ten of the kind

of men that can be obtained in an emergency. If the appropriation for maintenance of way labor could be made on a yearly basis and divided into equal monthly allotments, a constant force could be maintained which, to a very large extent, would do away with the necessity of employing a large extra force for renewals in summer and to take care of snow and ice in winter.

Neither should there be a reduction in the number of hours worked per week during certain seasons, for this results in smaller wage checks for the forces employed and amounts to a reduction in wages. A constant track force can only be maintained when the wages are comparable to those paid for a like class of work in other industries, taking into account uninterrupted employment with no loss of time due to weather conditions.

By maintaining a constant track force the large turnover in track labor would be reduced to a great extent, and at the same time, the work performed by trackmen could be classified as semi-skilled, resulting in elevating the position of the maintenance of way department relative to the other departments of the railroad. A constant track force means a skilled and efficient track force and a thorough test should convince the managements of our roads of the advantages of maintaining this constant force if we can arrange our renewal programs to cover the entire year. Tie and switch timber renewals can best be made during the spring and early summer; they can not be made economically during the winter months when the roadbed is frozen, but it is practical to make rail and switch renewals during this season.

A Suggested Distribution of the Work

For the purpose of improving the distribution of the work throughout the year it could be divided into three seasons. The exact division proposed here may not fully cover the conditions on all roads, but speaking generally would name the seasons as follows: (1) Tie Renewals; (2) Preparations for Winter, and (3) Rail Laying and Snow Removal.

The tie renewal season would extend from March 1 until the end of July, starting with a couple of weeks devoted to surfacing and lining to take care of rough track conditions resulting from the freezing and thawing of the roadbed during the winter season; and fol-

lowed by an intensive campaign to complete all tie renewals by the first of August. The ties and switch timber would be renewed and spaced (when necessary) first where new rail had been laid during the previous season; then renewing the ties on that portion of the tracks where new rail will not be laid during the coming season. By not having to stop tie renewals to lay and take care of new rail, it should be possible to complete the tie renewals at least in main tracks on practically all subdivisions during this season.

Preparing Tracks For Winter

The winter preparatory season would extend from August 1 to the end of October. During this season ties and switch timber should be renewed in yards and side tracks which are included in main line track foremen's sections. Tie renewals having been completed, tracks should be placed in the best possible surface and line—bad drainage conditions corrected and ballast cleaned where the track is liable to "pump." Special attention should also be given to the line and surface of tracks in which new rail is to be laid during the following season. When such tracks are not fully tie plated tie plates should be applied to every tie not provided with them and the track given a good surface. It is at the end of this season that track inspections are made on many railroads and from a track maintenance standpoint, this should end the year. In other words, the maintenance-of-track year should be from November 1 to November 1 and be financed regularly on that basis.

The rail laying and snow removal season would extend from November 1 until the end of February. During the first half of this season, November and December, all conditions are most favorable for rail renewals, tracks are in the best line and surface; tie renewals have been completed; temperature conditions for the men engaged in this heavy work are ideal; heavy vacation traffic is ended, and there is usually little interference from snow. During this time all long stretches of new rail should be laid first, so that a larger percentage of the gross allotment can be assigned to these two months. During the following two months the balance of the rail can be laid as weather conditions permit. By confining rail laying to the four months of the year in which weather conditions are not favorable for other track maintenance it will be possible to keep a constant track force working and at the same time obtain maximum efficiency from this force.

Provide For Expansion and Apply Rail Anchors

By the use of the rail thermometer and the exercise of proper care in the selection of track shims no difficulty should be experienced in obtaining the correct expansion at the joints. In order to hold the openings at the joints uniform, the rail should be anchored as soon as laid; in fact, the best practice is to apply rail anchors before the first train is allowed to pass over a stretch of new rail. It is also essential that rail anchors be selected that can be re-applied without losing any of their holding power in order that they may be re-used the following season when tie renewals are made and ties re-spaced.

It is the practice on many roads to employ an additional force for rail laying. This extra force is known as the "rail gang" whose only duty is to lay new rail. By reason of the fact that it is only a temporary gang, it is very difficult to work up any interest among the men in laying the rail properly and economically. Too

often new rail laid by these extra gangs is ruined before the regular trackmen can take care of it, due to irregular gage, loose bolts, tie plates that are not up square with the rail and poor spiking. This is true also when an attempt is made to lay exceptionally long stretches of rail in a short period of time, in other words, in attempting to make rail laying records.

By careful planning, new rail requirements on practically all roads can be arranged so that short stretches will be laid on a foreman's section each year. In this way only that amount of rail will be laid that can be taken care of properly by the regular section forces. The replacement of badly worn or bent rail and rail of light sections is a great aid to the supervisor in maintaining smooth riding track, but if new rail is laid and not taken care of properly, it becomes a detriment in a short time and will merit severe criticism from the higher officers.

Section Foremen Should Have Charge

To our mind, there is no greater crime than to spoil new rail by not giving it proper attention after it is laid. By "bunching" section gangs new rail can be laid during the "rail and snow removal season" without the aid of extra gangs and without interfering with other important work. If the foreman is a party to the laying of the rail that he will afterwards have to take care of and maintain, he will see to it that the rail is laid with as much care as possible. A section foreman should be in charge of and responsible for the proper rail laying on his section. While it may be possible to lay greater stretches of rail in a given time with an extra force after it has been organized, it is reasonable to believe that regular trained trackmen will do a much more efficient job and in the long run, taking future maintenance and damage to rail into consideration, will do it more economically.

Badges for Safe Motor Car Operation

ANY OFFICER or employee of the Atlantic Coast Line who operates a motor car for an entire calendar year without an accident to himself, his men or his

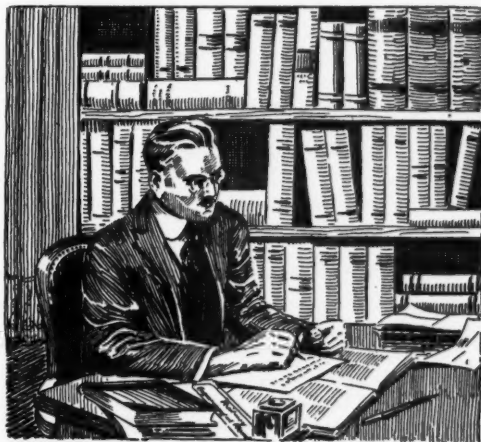
cars, is awarded an emblem in the form of a brass plate to be attached to his car. The character of this emblem is seen in the drawing. It is 4½ in. in diameter, and is enameled in purple and red with brass lettering and a circular border. Small holes are provided for fastening the plate to the car with small brass screws or nails. In addition to this emblem the motor car operator is provided with a year plate indicating the calendar year during which the motor car



The Motor Car Safety Emblem and Year Plate

was operated with a clear record. The awards for 1925 will be made as soon after January 1, 1926, as possible. During the following year, additional year plates will be awarded to all winners of emblems who have operated their cars during these additional years without accident.

What's the Answer?



This department is designed to serve as a reader's service bureau, wherein the many problems which arise in the routine maintenance of tracks, bridges, buildings and water service facilities, may be subjected to frank and thorough discussion. The value of the service thus rendered is proportionate to the extent to which readers avail themselves of it, in submitting questions and in lending their co-operation by offering answers to the questions presented.

How Should Guard Rails Be Modified to Take Care of Worn Wheel Treads?

Would the maintenance of curve or frog guard rails be improved by having a slightly lower guard rail for the high side (to compensate for worn treads) and a slightly higher guard rail for the low side?

Does Not Favor Any Variation

By J. R. WATT

General Roadmaster, Louisville & Nashville, Louisville, Ky.

I would not be in favor of different heights of guard rails for the high and low sides of curves. The natural result of the loads on the low rail is to depress it so that the guard rail will be slightly higher. We have no conditions which would make the lower guard rail on the outside of the curve necessary. Such an arrangement would complicate stocks.

It May Be Desirable in Special Cases

By G. W. MORROW

Supervisor, New York, New Haven & Hartford, New Haven, Conn.

My experience has been restricted to the use of guard rails of the same height as the running rail. I find this to be general practice and it is also common opinion that with this construction in properly maintained track and with speed regulations properly observed there is no necessity of using any different height of guard rail.

Questions to be Answered in the February Issue

1. *What arrangements should be made to paint the tops of steel stringers or deck girders where they are covered by the ties?*
2. *Is it advisable to use salt to prevent the accumulation of ice around switches, interlocking plants and other points in the track?*
3. *When repainting the walls of an old brick building what can be done to obtain an attractive appearance?*
4. *When about to lay rail in the winter, what measures should be taken to prevent the accumulation of snow, ice and frozen dirt on the rails and fastenings? What measures should be taken to remove that which has accumulated?*
5. *How should empty cement sacks be cared for and prepared for shipment to the mills and what measures should be taken to insure that this is done on small concrete jobs?*
6. *What are the relative merits of slaked and unslaked lime for water treatment?*
7. *What conditions of traffic makes the employment of a lookout man necessary to protect the men in a track gang from being hit by trains or engines?*
8. *Are flangeway guards necessary in bituminous highway crossings? If so, to what extent should they be used? Should they be used on skew crossings only or on all crossings?*

However, there are cases where the speed regulations are not observed fully and a slightly higher guard on the inside or low rail of the curve would have a tendency to increase safety of operation by decreasing the possibility of a derailment from the lifting of a truck on a tender or an improperly loaded car. The maximum height of the guard rail should not be over one inch higher than the running rail.

As regards a slightly lower guard rail for the high side of a curve I am of the opinion that little would be gained, other than saving the filler blocks from getting broken and thereby loosening the guard rail. If treads are worn so badly that it is necessary to maintain low guard rails the wheels should be changed.

Why Should Piles Be Skinned?

"What are the reasons for skinning piles for use in the foundations of piers and abutments?"

There Are at Least Three Good Reasons

By J. B. HUNLEY

Engineer Bridges and Structures, Cincinnati, Chicago & St. Louis, Cincinnati, Ohio

There are at least three good reasons: (1) The bark on any timber rots in a comparatively short time, even though the timber is kept damp, and when a pile is driven with the bark on as soon as this bark begins to rot or loosen from the pile there is an immediate loss of a portion of its supporting power. When piling is cut at a certain time of the year the bark is very loose

and will slip in driving and thus give a less effective pile. (2) A peeled pile is more easily driven than a pile with the bark on. (3) There is a considerable saving in freight in shipping piles peeled as compared with unpeeled piles, and where piles are stored on the ground for any length of time prior to driving the rotting of the bark will hasten deterioration of the timber.

The Presence of Bark Reduces the Bond Between the Pile and the Concrete

By A. I. GAUTHIER

Supervisor Bridges and Buildings, Boston & Maine, Concord, N. H.

I believe that the tops of all piles used in the foundations of concrete piers and abutments should have the bark removed so that there will be a more perfect bond between the concrete and the pile itself. If the bark is left on it will often shrink away or slip from the pile, leaving an imperfect bond.

What Can Be Done With a Winter Force?

"Where section gangs are reduced to a 'winter basis' of two or three men and a foreman, what work should they be expected to do during this season that will insure their being employed constructively?"

Little Real Work Is Possible

By ENGINEER MAINTENANCE OF WAY

In most of our territory, winter conditions are such that there is practically no constructive work that can be accomplished. I appreciate the desirability of maintaining a reasonable number of men on each section in order to provide as many employees as possible with permanent employment and thereby secure a more efficient organization. But the low temperatures throughout our northern and northwestern territory, with its resulting depth of frost, ties up all constructive work with the possible exception of rail renewals and the expense of this class of work during the winter months in this territory would be prohibitive.

Rail Renewals Offer the Most Profitable Field

By E. J. CULLEN

Division Engineer, Lehigh Valley, Auburn, N. Y.

The work to be done during the winter months should be determined by the conditions on the territory, and the number of men to be employed should be only sufficient to handle this work and meet emergencies. Economy can only be effected by employing these men on constructive work as far as it is possible to do so. Removal of snow and ice beyond the point of absolute necessity to keep the road open for operation is not constructive work and when track forces go beyond these necessities they are wasting money and have nothing to show for their labor when spring comes.

Where section gangs are reduced to a winter basis of two men and a foreman the most constructive work in which they can be engaged is rail laying—to get the rail laid in main track or sidings and the old rail picked up out of the way and disposed of as quickly as possible so that the track will be ready for the season's work of tie renewals, surfacing, etc., as soon as the season opens up. In winter rail laying it is necessary to be very particular with the adzing, and light shims may be used

if necessary to be sure that the rail will suffer no damage. On the Auburn division of the Lehigh Valley we have laid 22 miles of 100-lb. relayer rail replacing 80-lb. rail on single track during a winter season by bunching section gangs consisting of a foreman and two men.

Building right-of-way fence is constructive work and the adoption of steel fence posts has aided very materially in making it possible to build the right-of-way fences during winter months in an economical manner. At points where gaging of track is necessary this work can be performed during the winter months to good advantage. On sections where there is brush on the right-of-way it is advantageous to allow it to remain during the mowing season and thereby shorten the period of mowing and to cut and burn this brush during the winter months.

Much Work Can Be Done If Properly Planned

By ALEX ANTMYNICK

Section Foreman, Canadian National, Riverhurst, Sask.

As soon as the ground freezes up in the fall the section foreman should plan his work for the winter so that he will get as much of it done as possible before heavy snow-fall although most of it can be done during a large part of the winter. He should plan to set up all of his snow fences early and also clear from the track the weeds that were not burned during the summer months or fall. Track spikes should be driven down from one end of the section to the other, fences should be repaired, etc.

Other work which can be done in the winter includes such items as renewing frogs, switches and guard rails, making repairs to track fastenings, tightening bolts, renewing crossing planks, gaging track, installing tie plates, etc. A foreman must also keep a close watch for broken rail and heaved track and renew defective rails and angle bars as he finds them. Of course, during the severe weather he will have to devote most of the time of his gang to fighting snow and ice, not only in the track but around platforms so that the stations may be used by the patrons of the road with the least inconvenience.

Winter Work on Trestle Decks

To what extent can wooden trestle decks be repaired or renewed in winter?

Little Difference in the Cost of Summer and Winter Work

By J. P. WOOD

Supervisor Bridges and Buildings, Pere Marquette, Saginaw, Mich.

The work of repairing or renewing wooden trestle decks can be performed in winter nearly as well as during the summer months and in the end perhaps as advantageously for the railroad company. While we all agree that in the northern climate the average man can work to better advantage in the spring, summer or fall than he can during the winter, yet in many instances the difference is so slight as to be almost negligible.

The cost may or may not be more in winter than in summer, depending entirely upon the amount of snow and ice to be contended with. If there has been any amount of snow fall coupled with mild weather and sunshine the snow is bound to adhere to the timber to some extent, necessitating its being removed and adding this extra labor to the cost. However, where the deck is to be renewed and train service is frequent, old stringers

have to be thrown into the stream to get rid of them in the shortest possible time and in winter with the stream frozen over they can be picked up more readily and with less expense than they can be pulled out of the water in summer.

We must all admit that the factor of safety to the men should be taken into consideration. In winter they are more liable to fall, owing to the presence of snow and ice as well as to the fact that heavier clothing prevents them from moving as quickly or regaining their balance as readily in case of a slip. But with a careful foreman in charge the danger can be reduced to a minimum.

Any additional expense incurred by doing this work in winter will be more than offset by keeping more of the old men constantly employed and contented, thus having them when spring comes and they are needed.

Open Floor Trestles Offer No Difficulties

By J. S. HUNTOON

Assistant Bridge Engineer, Michigan Central, Detroit, Mich.

Open floor trestles with stringers and ties can be renewed in winter just as cheaply as in extremely hot weather. Ballast floor wooden deck trestles should not be renewed in winter on account of the difficulty of handling frozen ballast.

Three-Throw or Lap Lead Switches?

"What are the relative merits of three-throw split switches and the lap arrangement of switches? Does the three-throw switch involve any special problems of maintenance?"

The Lap Switch Is Better

By A. CRAINE

Engineer Maintenance of Way, Chicago, Burlington & Quincy, St. Louis, Mo.

Neither arrangement is desirable but where necessary the lap switch is to be preferred for the following reasons: (1) It is safer, on account of the difficulty of maintaining exact adjustment of points with the three-throw switch. (2) In a three-throw switch, one pair of points fits against another pair of points, instead of against a full rail. The points wear more rapidly than a full ball rail, necessitating more frequent renewal of points to maintain a proper fit. (3) In the lap arrangement the same switch points and fittings are used as in an ordinary split switch, while the three-throw switch requires special points, rods and stand. This necessitates a stock of special repairs, while standard parts, which are readily available, can be used on the lap switches.

The special maintenance problem with the three-throw switch is to keep the switch rods in perfect adjustment, so that the points will fit up in all positions.

Neither Type Is Favored

By G. S. CRITES

Division Engineer, Baltimore & Ohio, Baltimore, Md.

Three-throw split switches and tandem or lap switches involve special switch timber, and usually a special, or at least an unusual number of frogs, and therefore their use is not advantageous from a maintenance standpoint, as the fewer the special frogs or layouts the better the maintenance is liable to be.

Because the operating stands or mechanisms are a little out of the ordinary, there is considerable oppor-

tunity for men handling these switches to become confused and cause accidents. This does not prevail so generally where regular men operate the switches, but men not familiar with the territory may line up the switches wrong with either the three-throw or the lap or tandem arrangement.

The use of this arrangement of turn-outs is justified where property values are high, or where grade crossings are to be avoided, or in other congested territories where there is no room to get the desired turn-out without their use.

Should Hydrant Pits Be Packed Without Sawdust?

Should hydrant pits be packed with sawdust or other material to prevent freezing? If not, how should they be protected?

Placing and Removing of Packing Is Expensive

By E. M. GRIME

Engineer Water Service, Northern Pacific, St. Paul, Minn.

While sawdust is a good insulator, the placing of it at the approach of freezing weather and the removal again in the spring, is quite an item of expense. Furthermore, its removal and replacement during the winter, in case repairs become necessary, is inconvenient and expensive and there is a tendency to create an untidy appearance of the premises.

Where there is an open drain connection in the bottom of the pit there is usually sufficient warmth from the ground to prevent freezing, providing a false cover has been placed about one foot below the top so as to create a dead air space. In extreme cases it may be advisable to put in a second false cover, giving two dead air spaces for insulation. These covers should be made to fit closely and be jointed where the pipes pass through so they may be removed readily when necessary.

Sawdust Packing Causes Corrosion

By H. P. BLAKE

Engineer Water Supply and Heating, Canadian National, Winnipeg, Man.

Hydrant pits should not be packed with sawdust because of the harmful results of the intensive oxidation that is continually affecting the pipes when the sawdust is wet. If the sawdust could be kept dry it would help to prevent the water pipes from freezing, but many years of experience have taught me that the sawdust does get wet, either from water spilled at the hydrant, rain, or melting snow. I have had to renew two-inch galvanized pipe that had been packed in sawdust, after only two years service.

In this country the temperature frequently goes down to 50 deg. below zero, and in order to protect the mains from frost they have to be installed with approximately eight feet of cover, the branch being taken from the side and brought to the surface in a manhole 24 in. square with a frost floor 3 ft. from the surface and about 5 ft. above the top of the main. The top is fitted with a good fitting cover, the whole forming a dead air space, but no sawdust or other packing is used. Each manhole is connected to the sewer.

At division points where coaches have to be watered, or, as sometimes happens, a frozen toilet or other fixture must be thawed out, 8 or 10 shallow manholes are installed at the side of the tracks along the front of the

depot about 75 ft. apart and pipe lines (steam, water and air) are installed in a 12-in. by 12-in. closed wood box with its top about 12 in. below the surface but no sawdust or other packing is used, for the heat from the steam line does all that is required. There are hundreds of such services on this region, and it is rare to hear of any freeze-up.

If the conditions were such that a packing of some kind would be necessary to prevent freezing, I would use mill shavings, straw or hay packed tight, but I certainly would not use sawdust.

Would Use Manure Instead of Sawdust

By E. R. WENNER

Supervisor Bridges and Buildings, Lehigh Valley, Wilkes-Barre, Pa.

We build our hydrant pits out of three-inch yellow pine plank and make them not less than 3 ft. 6 in. deep in all cases. We place an extra lid, also made of wood, under the top cover so as to form an air space. All of the hydrant pits we have in use are constructed in this way and we have not had one freeze. However, if freezing should occur in hydrant pit at any time, I would place manure in the pit rather than sawdust to prevent it from freezing again.

Should Money Be Spent for Neatness?

To what extent are maintenance forces warranted in devoting time to cleaning up and improving the appearance of the right-of-way, particularly about depots and other facilities accessible to the public? In what direction, if any, are beneficial effects evident?

Some Attention to Appearances is Required on All Classes of Line

By H. R. CLARKE

General Inspector Permanent Ways and Structures, Chicago, Burlington & Quincy, Chicago

This question is a difficult one to answer definitely, since conditions and standards vary to such an extent on the different roads and quite often on the same road, depending on the class of line and the expenditures which are being allowed.

When forces are limited and there is urgent work to be done to maintain smooth riding track and important and fundamental things to care for in order that track may go into the winter in good condition, it is hard to convince the roadmaster that he should or can use any of his forces in cleaning up and improving the appearance of the right of way. If the roadmaster can be convinced that such cleaning up is really helpful and beneficial, he will be more willing to see that it is done. Under any conditions, maintenance forces are warranted in devoting sufficient time to cleaning up right of way, station grounds and yards to make sure there will be no accidents or personal injuries, due to the untidy condition. This means that weeds, brush, etc., in any way obstructing the view at crossings, switches, signs or signals must be cut, material or debris that might cause an accident must be cleaned up and fire guarded against by cleaning up and burning grass, weeds and rubbish wherever this is necessary. In addition to this, station grounds, drives, etc., used by the public and yards and switch leads in constant use by employees, must be kept filled in, leveled and smoothed up.

The above is imperative, but maintenance forces usually spend more time in cleaning up and improving appear-

ance than the minimum set forth above makes necessary. This is the variable and depends on several factors. On light traffic lines where the standard of maintenance is not high, towns small and forces very limited, the work outlined above as imperative, may possibly be all that is justified or necessary. However, at the larger towns on even these very light lines, more attention must be given to appearance and some time put in to maintain the desired standard.

On the more important lines a neat and attractive right of way is more essential and must be given time accordingly. A clean right of way and neat station grounds have beneficial effects in several ways. Most important perhaps is their effect on the public. To a large extent the public traveling on trains judges a road by the appearance of the right of way, stations and equipment. The residents in towns and communities along the line judge by the same standard, so for the sake of a favorable opinion on the part of the public, a clean right of way and attractive station grounds are essential.

There is a desirable effect also, on the employees, although this is rather hard to set out definitely. If the right of way and the station grounds are neat and kept so, the track men will naturally take more pride in their work and do it just a little better. Their work on the track will be neater and therefore more workmanlike. The agent will be more careful of conditions in the station and the freight house and will find it a little easier to uphold the standing of the road with those he comes in contact with in a business way.

The expenditure of time and money these benefits will justify cannot be definitely stated on account of the many and varied factors that enter. However, a lawn or parking with a few shrubs and a small flower bed or two at the station, a clean, smooth drive at the team track, a yard lead free of obstructions and rubbish and a right of way maintained to a uniform standard, are well worth the time required.

It Pays for Several Reasons

By EARL STIMSON

Chief Engineer Maintenance, Baltimore & Ohio, Baltimore, Md.

The keeping of right of way, station grounds and other facilities cleaned up, has the same beneficial effect with the railroad, as a well washed face, a clean collar, a neatly tied necktie and freshly shined shoes have with the man. Nothing has a more destructive effect upon the general morale of the maintenance forces than to neglect this feature.

If you permit the right of way and roadbed to grow up in vegetation, permit old ties and released material to lie scattered around and accumulate along the road, permit roadway signs to remain out of plumb, allow draw bars and other car scrap to lie along the track where pulled out, the men will get the idea that that is the way you want things done, and they will become slovenly in their workmanship as applied to the track itself.

The public receives its impression of a railroad largely from the service it gets and what it sees. If it sees a slovenly, poorly kept right of way and station facilities, the impression is likely to be formed that the service will be of the same kind, and the use of that railroad will be avoided if possible.

Maintenance forces are warranted in devoting whatever time is necessary to keep the property cleaned up, and this in itself, will bring about a marked improvement in the appearance of the property. Such "improving" as the parking of station grounds, the planting of shrubbery, flower beds, etc., while desirable, is not essential, and is a luxury to be indulged in only to the extent of

the individual tastes of the railroads and their ability to pay for it. Good "housekeeping" is one of the fundamentals of good maintenance and probably one of the most difficult to establish, but once the men are educated up to it and the road cleaned up, it costs but little additional effort to keep it so.

Wallboard as a Substitute for Plaster

Under what conditions may wall board be used in place of plaster?

It Is Particularly Useful on Unimportant Work

By A. T. HAWK

Engineer Buildings, Chicago, Rock Island & Pacific, Chicago.

To answer this question intelligently it is necessary to make a distinction between paper pulp board and plaster board. During the past few years we have used a considerable amount of wall plaster board but have used very little paper pulp board as the latter material does not seem to be suitable for railroad work because it will not stand dampness buckling and coming off buildings readily that are not heated. We use wall board where we have only a comparatively small amount of plastering to do in order to get away from the excessive cost of plastering a small job. The wallboard does not give as good a wall covering as plastering but there are many places where we do not need first class construction and by using wallboard we get away from a lot of trouble and expense.

There Are Many Opportunities for Its Use

By RAILROAD BUILDING CONTRACTOR

There are many brands of wallboard on the market and it is my experience that the railroads find a wide use for them. There is a great range in quality from the cheap pulp board to the more expensive makes composed of gypsum or several varieties of hard fibres. Some of these are affected by the moisture in the atmosphere while others are apparently unaffected by weather conditions insofar as use inside of buildings is concerned.

As regards the better grades of wallboard the cost insofar as the material is concerned is no less than that of lath and plaster. The real saving is in the labor, because with the present rates of wages paid to plasterers and lathers the labor charge for carpenters applying wallboard is much less than that required to apply lath and plaster. In general it may be said that wallboard of the better classes may be used in any railroad structures except the more important passenger stations and office buildings where it is desired to obtain a high grade interior wall treatment.

Reducing Hours Rather Than the Force

To what extent is it desirable and practicable to work all members of section gangs part time in lieu of laying part of the men off?

A Further Answer to an Old Question

By H. C. MURPHY

Engineer Maintenance of Way, Chicago, Burlington & Quincy, Lincoln, Neb.

Let us assume the men have equal ability—on one gang one might find but little difference in the seniority of the men, while perhaps on the adjoining gang there

would be a wide difference in length of service. On the first gang the older men might be willing to work half time so as to permit the others to earn their share while in the second case there would be very likely a reluctance on the part of the older men to give up the rights they feel should be theirs by reason of a longer period of service. On the theory that "half a loaf is better than none" the idea of working all the forces part time would suit the younger man in the service very well but would not seem quite fair to his older co-worker who may possibly have been in the service many years longer than he.

Assuming two men of equal ability, and both loyal and diligent workers, one may have been with the company for years, accepting work when it was offered and the lay-offs when they came his way. But through it all he remains until he has accumulated enough seniority to assure him steady work. The second man may be just as conscientious—just as hard a worker—just as loyal as the first but may not have had one-third or one-half the length of service as the first. It seems to me that the former man by his longer years of faithful service has built up a certain amount of "good will" with his employer and is entitled to more consideration than the younger man.

I do not believe it either desirable or practicable to rotate the work among all the men in lieu of laying part of the gang off for to do so would in my opinion mean that none of the men would be satisfied. The older men would feel that they were being unfairly treated. Such an arrangement would no doubt act as a discouragement to the more competent and able employees and result in lowering the efficiency of the forces as a whole. I do not believe any arbitrary rule should be made, nor do I believe it practicable. It should be left to the men themselves to decide. If there were one thousand gangs there would be apt to be just that many different ideas and in my opinion the action taken must be entirely voluntary on the part of the men themselves.

A Method for Numbering Switches

S. MILLER, a section foreman on the Chicago, Burlington & Quincy, at Edgemont, S. D., has developed a plan for numbering yard switches with low stands where lamps with discs are used in place of targets. The number is painted in white with a black background on a sheet of car roofing metal approximately 4 in. by 4 in. with a triangular flange at the bottom bent at right angles and provided with a 3/4-in. hole for bolting to the base of the stand. The numbering of switches is



A Dwarf Switch Stand with a Numbering Plate.

more important in some yards than in others, depending upon the extent to which the switches are referred to by number by the operating organization. Where numbering is found of advantage the plan devised by Mr. Miller should prove valuable.

AUTOMATIC COUPLERS—On July 20, 1925, the Japanese Government Railways completed the work of equipping all locomotives and cars with automatic couplers. The new couplers are partly of American make and partly of a design developed in Japan.

New and Improved Devices



A New Material for Making Bitumen Highway Crossings

WINTER CONDITIONS impose problems in many fields and frequently lead to the development of special measures or materials best suited to meet them. This has been the case in the construction of bitumen highway crossings, for after an extended experience with the use of its product, Headley No. 1 emulsified asphalt, under all kinds of climatic conditions, the Headley Good Roads Company, Philadelphia, Pa., has developed a new material known as Viafalt which is designed especially for use in cold weather in the making of bitumen crossings although it may be used at any time in the year. In general it is similar to the Headley No. 1 oil but has certain added advantages which have been outlined by the manufacturer as follows: It can be used successfully at all temperatures above freezing; it cannot be destroyed by freezing; it may be used with any kind of mineral aggregate; it will mix much easier with the mineral aggregate, and in machine mixing there is not the same danger of over-mixing.

The methods recommended by the manufacturer for the use of this material are as follows: For hand mixing place the stone or gravel on a board and spread two-thirds of the required amount of Viafalt over it and then turn the mass over several times with shovels and rakes. After this has been done add the balance of the Viafalt and continue mixing until all the aggregate has been thoroughly coated. In machine mixing the same procedure is followed, namely that two-thirds of the desired quantity of Viafalt is put into the mixer, followed by the stone and then by the balance of the Viafalt. It is said that crossings constructed with this material are equally stable in summer or winter, namely, that they do not bleed in summer and do not become brittle in cold weather.

Joseph Dixon Crucible Company Introduces Aluminum-Graphite Paint

THE JOSEPH Dixon Crucible Company, Jersey City, N. J., has developed aluminum-graphite paint for use on exposed metal work where an aluminum or light colored paint is required. This product is composed of aluminum combined with flake silica, graphite pigment and boiled linseed oil. The aluminum used for paint making is of flake formation and when combined with this pigment, is claimed to lap one flake over another, forming a covering of marked elasticity and durability.

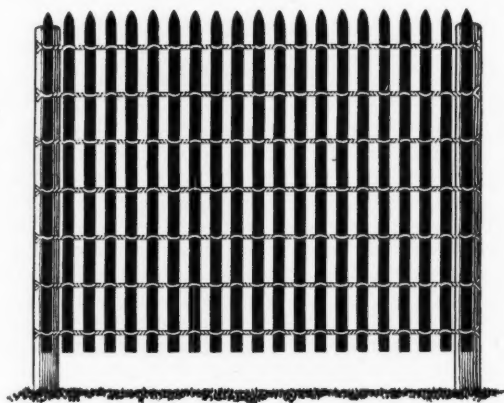
It is as durable as the red lead graphite primer and the silica graphite paint of the same company. Its luster is slightly less than that of a straight aluminum paint. It is said to retain its color after light colored aluminum paints have darkened and to resist the attacks of sunlight and moisture. It reflects light and heat, thereby adapting

it particularly to industrial uses. It is said that it will keep the temperature of materials contained in tanks lower than dark colored paints.

It can be applied with the paint spray or a brush, although the latter is recommended by the manufacturer. It can be brushed over a dark coat of paint, one coat being sufficient to cover the under surface properly.

A Unique Snow Fence

IN MANY locations, snow fences must be placed beyond the right-of-way line, a requirement which necessitates the erection of the fence in the fall and its removal in the spring before the land on which it is located is placed under cultivation. This condition has led to the development of a type of snow fence which is designed to reduce the labor of periodic construction and removal, and which also meets the requirement of the well-known principle that the most efficient snow fence



A Panel of the Picket Snow Fence

is one that produces a drift on the leeward side by reducing the velocity of the wind in blowing through it.

It is a picket fence formed by weaving wooden laths 9/16-in. by 1½-in. by 6 ft. long with seven double strands of galvanized wire, leaving slots 2 in. wide between the pickets. The pickets are given a Gothic point at the top so that they will effectively shed the water formed by the melting of the caps of snow formed at their tops during storms. This pointing of the pickets is done by means of a draw shave machine, which produces a much smoother surface than sawing. The pickets are given a coating of red paint.

The wire is No. 12 gauge copper-bearing steel, galvanized by a process which embraces a heat treatment that insures a heavy coating of zinc with a smooth surface, thus making for long life. The fencing is supplied in rolls containing 88 ft. of fence and weighing 450 lbs. These rolls are about 35 in. in diameter and can be

handled readily by two men in the same manner as a barrel. This fencing is mounted on pointed wood or steel posts spaced 10 to 12 ft. apart and driven two feet into the ground. The fencing is fastened to the post with wire ties—usually about three ties to the post. The manufacturers recommend that the fence be placed so as to clear the ground 12 in. Experience with this fence has demonstrated that it forms a thoroughly effectively snow barrier. It is manufactured by the Illinois Wire & Manufacturing Company, Joliet, Ill.

A Canvas Bag for Handling Ballast

THE L. H. GILMER Company, of Philadelphia, Pa., is placing on the market a bag of webbing and canvas for handling ballast which is stiff enough to stand alone and remain open while being loaded. This bag is said to be strong enough to permit of its being dragged over rough ground when filled with rock or metal objects and is also collapsible so as to be readily stored. This bag was devised to meet the need of a large eastern railroad for a means of handling ballast on one of its most congested sections and has been thoroughly tested as a substitute for the wooden boxes and metal cans which had been used previously.



The One Man Ballast Bag

The fact that the bag stands upright and stays open makes it possible for one man to handle it in loading, instead of requiring a helper to hold the bag open while the load is shoveled in. The bags are sufficiently rigid so that the loaded bags can be lifted on a flat car without spilling the contents.

The bottom of the bag is of heavy, closely woven, two-ply cotton belting stock cupped in a form, thus leaving no seams, joints or rough places to come in contact with obstacles over which the bag may be dragged. The side wall is of heavy canvas and the junction of the side and bottom is protected by a strip of belting stock. Another piece of belting stock is put around the top to protect the edge and hold the bag open.

Inundator Insures Accuracy of Concrete Proportions

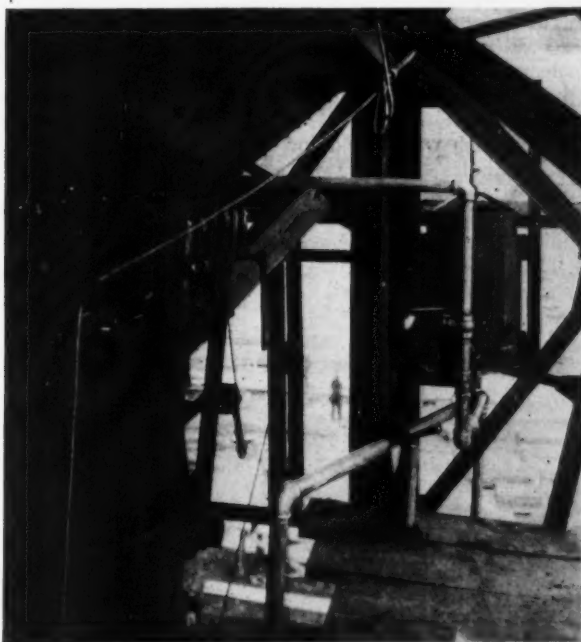
ONE OF THE pertinent facts which has been developed as a result of more recent studies of concrete is that the mixes or proportions are subject to marked inaccuracies due to a peculiar property of sand, namely, the pronounced change in the volume of the sand which occurs with variations in the amount of the moisture it contains.

This bulking tendency of sand introduces practical difficulties in any effort to proportion concrete accu-

rately because the sand in the stock piles on a concrete job contain unknown quantities of water, depending on the condition of the pit from which the sand is taken or the condition of the weather. The fact that the amount of moisture is unknown not only makes the volume of the sand uncertain but it also makes it difficult to determine the correct amount of mixing water which should be added.

A way out of this difficulty has been found with the aid of another property of sand, namely, that when it is flooded with an excess of water (inundated) the sand loses its bulking property and the volume becomes exactly the same as perfectly dry sand. This has led to the development of the "inundation" method of measuring sand for the proportioning of concrete.

This principle has been applied by the Blaw-Knox Company of Pittsburgh, in the development of a mechanical inundator to form a part of the charging equipment of concrete mixers. The inundator consists essentially of a steel cylinder with an adjustable bottom so that its volume can be changed to give whatever proportion of sand is desired for a batch of a given



The Inundator is at the Left Under the Material Hopper

mix. This cylinder is mounted on trunnions so that it may be dumped readily into the hopper of the mixer but is so placed that it fits closely under the discharge opening of the sand storage bin. This cylinder is filled about one-third full of water, or slightly in excess of the amount necessary to inundate a cylinder full of sand. A strike-off gate at the bottom of the sand bin is opened and the sand allowed to flow into the inundator. A hand-operated shaker grate in the bin directly over the gate has the effect of causing the sand to flow down in a series of streams.

When the inundator is full, i. e., when the sand stops flowing, the excess water overflows the top of the inundator and runs out of a spout. The strike-off gate is then closed and the contents of the inundator, that is, a given volume of sand measured in the inundated condition, is dumped into the mixer hopper.

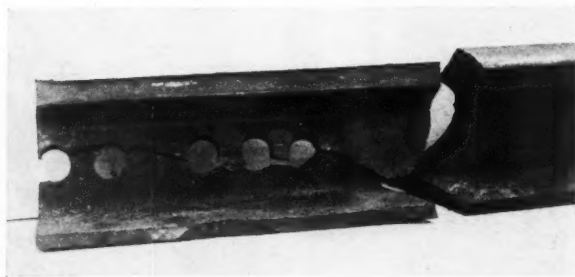
The water in the inundated sand can be determined with reasonable accuracy by multiplying the

volume of the sand in the inundator by the percentage of voids in the sand. This water forms a part of the water of mixing and subtracting this amount from the total amount of mixing water it is desired to use, gives the amount of water which must still be added. This is supplied from an excess water tank which also forms a part of the equipment.

Additional Bolt Holes Lead to Rail Failure

A PASSENGER train on the Pennsylvania Railroad was derailed at a facing-point switch about $2\frac{1}{2}$ miles west of Martinsville, Ill., about day break on September 15, resulting in the death of four employees and one other person, and the injury of 13 persons. In a report made by the director of the bureau of safety of the Interstate Commerce Commission it is stated that this derailment was caused by the breaking of the lead rail of a switch which had been weakened in the web by the drilling of five bolt holes. This rail was drilled originally to receive track bolts spaced according to the standard in use in 1915. When prepared as a lead rail in August, 1915, it was shortened about $2\frac{1}{2}$ in. in length to make the switch points come opposite each other and new holes were drilled with the same spacing as before. In June, 1924, a new No. 10 frog was installed which was drilled for a new standard angle bar, the bolt holes of which were spaced $7\frac{1}{4}$ in. apart instead of the former spacing of $5\frac{1}{2}$ in. Another hole was then drilled in this rail to accommodate the new angle bars, making five holes in all, $1\frac{3}{16}$ in. in diameter.

The angle bars were 24 in. long, therefore covering 12 in. in length of the rail. Of this length the five $1\frac{3}{16}$



How the End of the Lead Rail Was Weakened by the Repeated Drilling of Bolt Holes

in. holes reduced the area of the web along its middle element, $49\frac{1}{2}$ per cent. In this weakened condition the rail was put into service, where it remained for a period of 11 months and then failed, precipitating this derailment.

Some time during the period the rail was in service partial rupture of the web took place, separating the section between the first and second bolt holes, counting from the end of the rail. A fracture was also started in the web below the first bolt hole near its junction with the base.

The line of rupture in the final fracture of the rail passed through the remaining sections between bolt holes. From the fifth bolt hole the line of rupture extended obliquely downward to the upper surface of the base, where one branch separated the base, while the other branch took an upward course and separated the metal of the web and the head, thus completely rupturing the rail. Longitudinally the greater part of the length of the line of rupture was covered by the angle bars.

With the Associations



Bridge and Building Association

A meeting of the executive committee will be held at Chicago on December 5 at which time committees will be appointed for the ensuing year and other plans inaugurated.

The Roadmasters' Association

The executive committee of the Roadmasters' Association will meet at the Auditorium Hotel, Chicago, on December 12, to determine the personnel of committees and perfect other plans for the work for the ensuing year.

Metropolitan Track Supervisors Club

At a meeting held at the Hotel Martinique, New York City, on November 14, a report on the proper time at which to lay rail was presented by G. H. Stewart, supervisor, Penna., North Philadelphia, Pa., and chairman of the committee. This report is abstracted elsewhere in this issue. The next meeting of the club will be held on January 9, 1926, at which time the subject to be considered will be Why Rail Anchors Are Being Used Today.

The American Railway Engineering Association

The committees are rapidly completing their reports; the secretary has received complete reports ready for the printer from three committees, together with portions of several other reports.

W. C. Barnes, formerly assistant engineer on the staff of the consulting engineer of the Southern Pacific System, with headquarters in New York, has been appointed assistant engineer of tests for the Rail Committee.

The Wood Preservers Association

Plans are being completed rapidly for the twenty-second annual convention which will be held in the Cleveland Hotel, Cleveland, Ohio, on January 26-28, 1926. The reports of five committees and the manuscript for one paper are already in the hands of the printer. A meeting of the executive committee will be held in Chicago on December 16 at which time the remaining details concerning the program will be completed.

The nominating committee has placed in nomination the following officers for the ensuing year: For president, C. F. Ford, superintendent tie and timber department, C. R. I. & P., Chicago; first vice-president, O. C. Steinmayer, superintendent timber preservation, Canada Creosoting Company, Toronto, Ont.; second vice-president, H. R. Condon, assistant forester, Penna. System, Philadelphia, Pa.; secretary-treasurer, E. J. Stocking. Members of executive committee: F. S. Shinn, supervisor treating plant, C. B. & Q., Galesburg, Ill., and J. S. Penney, general superintendent of plants, T. J. Moss Tie Company, St. Louis, Mo.

Directory of Associations

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, secretary, 319 North Waller avenue, Chicago. Next convention, Richmond, Va., October 19-20, 1926.

AMERICAN RAILWAY ENGINEERING ASSOCIATION (Works in co-operation with the American Railway Association, Division IV).—E. H. Fritch, secretary, 431 South Dearborn street, Chicago. Next convention, Congress Hotel, Chicago, March 9-11, 1926.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—E. J. Stocking, secretary, 111 West Washington street, Chicago. Next convention January, 1926, Cleveland, Ohio.

BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—B. J. Wilson, Pocket List of Railroad Officials, 605 Fischer Building, Chicago. Annual exhibit at convention of American Railway Bridge and Building Association.

NATIONAL ASSOCIATION OF RAILROAD TIE PRODUCERS.—J. S. Penney, secretary, T. J. Moss Tie Company, St. Louis, Mo. Next convention January, 1926, Cleveland, Ohio.

NATIONAL RAILWAY APPLIANCE ASSOCIATION.—C. W. Kelly, secretary, Seeburger Building, 825 South Wabash avenue, Chicago. Annual exhibition at convention of American Railway Engineering Association.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—T. F. Donahoe, secretary, 428 Mansion street, Pittsburgh, Pa. Next convention at Chicago.

TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo-Ajax Corporation, Hillburn, N. Y. Annual Exhibit at convention of Roadmasters' and Maintenance of Way Association.

Training a Track-Walker*

BY EDWARD NELSON

Section Foreman, Chicago, Rock Island & Pacific, Agawam, Okla.

CONSIDERABLE has been said and written and a lot of figuring has been done regarding the return for money paid out for patrolling track. In my estimation, it is money well spent. I know several instances in which it has saved the company thousands of dollars in preventing a wreck.

A good track-walker must be well trained, first, to be an efficient worker; second, a trustworthy track-walker, and finally, to be a responsible section foreman. When I hire a man I tell him that he must perform his duty faithfully, and in return for his pay give an honest day's work to his employer and observe "Safety First," not only for himself but also for his fellow workman.

Then I give him the book of rules to read and study. I examine him on the rules and show him the necessity of knowing them. When, in my estimation, the man is trustworthy and loyal, I use him as a track-walker, but before sending him out I explain in detail what he is going over the track for and the importance of it; that he must inspect thoroughly all switches, culverts, bridges, cattle-guards, surface and line, and pay particular attention to gauge on curves. He must look for spread track, look out for telegraph wires; close gates if any are open, drive any stock off the right-of-way and pick up scrap and place it on motor car set-offs so that it can be picked up readily. He must watch everything, no matter how small as it is the little things that count.

I show him the importance of patrolling the track, night or day, winter or summer, rain or snow, no matter what the weather conditions may be, and that it is our duty to our employers and to the public to comply with the rules for patrolling the track to save lives and property. When I have done this faithfully, and have done my best to train a man for the job of track-walker, our company has a good, trustworthy man for promotion

*Abstracted from an article appearing in the Rock Island Magazine for September, 1925.

The Material Market

WITH THE average daily sales of iron and steel exceeding the rate of production and with practically all mills working to 80 per cent or more of capacity, there has been a marked tendency on the part of producers to talk of so adjusting production to demand as to place prices on a definite upward trend. It is, of course, impossible to forecast the effectiveness of this movement but it is safe to say that prices for the early part of 1926 will be as high or higher than those now prevailing.

The railroads continue to comprise the important factors in the demand, rail orders in particular being the leading feature during the past month. It is believed that practically all large orders are now in. Track fastening orders have also been heavy but are still expected to continue in volume for some time.

The tendency in current prices in the various items is closely parallel to the activity in the demand in each field. Thus in the table below advances are indicated in track spikes, tie plates, structural steel, rivets and reinforcing bars.

| | PRICES PER 100 LB. | | | |
|---------------------------------------|--------------------|------------------|------------------|------------------|
| | October | | November | |
| | Pittsburgh | Chicago | Pittsburgh | Chicago |
| Track spikes..... | \$2.80 to \$3.00 | \$2.80 to \$3.00 | \$2.80 to \$3.10 | \$2.80 to \$3.10 |
| Track bolts..... | 3.90 to 4.25 | 3.90 to 4.25 | 3.90 to 4.25 | 3.90 to 4.25 |
| Angle bars..... | 2.75 | 2.75 | 2.75 | 2.75 |
| Tie plates, steel..... | 2.35 to 2.40 | 2.35 to 2.40 | 2.35 to 2.50 | 2.35 to 2.50 |
| Boat spikes..... | 3.25 | 3.25 | 3.25 | 3.25 |
| Plain wire..... | 2.50 | 2.55 | 2.50 | 2.55 |
| Wire nails..... | 2.60 to 2.65 | 2.65 to 2.70 | 2.65 | 2.70 |
| Barb wire, galv..... | 3.35 | 3.40 | 3.35 | 3.40 |
| C. I. pipe, 6 in. to 12 in., ton..... | | | | 50.20 |
| Plates..... | 1.80 to 1.90 | 2.10 | 1.90 to 2.00 | 2.10 |
| Shapes..... | 1.90 to 2.00 | 2.10 | 1.90 to 2.10 | 2.10 |
| Bars, soft steel..... | 2.00 | 2.10 | 2.00 to 2.10 | 2.10 |
| Rivets, struct..... | 2.40 to 2.50 | 2.60 to 2.65 | 2.60 | 2.75 |
| Conc. bars, billet..... | 2.00 | | 2.00 to 2.10 | |
| Conc. bars, rail..... | | 2.00 | | 2.00 to 2.10 |
| Rail, per gross ton, f.o.b. mill..... | | 43.00 | | 43.00 |

The table below indicates a moderate upward movement of the prices for scrap during the past month. However, current reports indicate a curtailment of scrap sales at this time.

| | PRICES PER GROSS TON AT CHICAGO | |
|-----------------------------------|---------------------------------|--------------------|
| | October | November |
| Relaying rails..... | \$26.50 to \$21.00 | \$26.00 to \$31.00 |
| Rails for rerolling..... | 18.50 to 19.00 | 19.50 to 20.00 |
| Rails less than 3 ft. long..... | 19.50 to 20.00 | 19.75 to 20.25 |
| Frogs and switches cut apart..... | 17.50 to 18.00 | 18.50 to 19.00 |
| Steel angle bars..... | 18.50 to 19.00 | 19.50 to 20.00 |

From the standpoint of conditions throughout the past month no marked change has taken place in the lumber market, the relation of sales to production remaining practically constant.

| | SOUTHERN PINE MILL PRICES | |
|--|---------------------------|----------|
| | October | November |
| Flooring, 1x4, B and B flat..... | \$46.33 | \$49.50 |
| Boards, 1x8, No. 1..... | 36.37 | 33.96 |
| Dimension, 2x4, 16, No. 1, common..... | 29.28 | 28.36 |
| Dimension, 2x10, No. 1, common..... | 30.67 | 32.62 |
| Timbers, 4x4 to 8x8, No. 1..... | 27.97 | 22.88 |
| Timbers, 3x12 to 12x12, rough..... | 36.75 | 40.20 |

| | DOUGLAS FIR MILL PRICES | |
|--|-------------------------|----------|
| | October | November |
| Flooring, 1x4, No. 2, clear flat..... | \$27.00 | \$27.00 |
| Boards, 1x8, 6 to 20, No. 1, common..... | 16.50 | 15.50 |
| Dimension, 2x4, No. 1, common..... | 17.50 | 17.00 |
| Dimension, 2x10, 16, No. 1, common..... | 17.00 | 16.50 |
| Timbers, 6x6 to 8x8, No. 1, common..... | 21.00 | 21.00 |
| Timbers, 10x10 to 12x12, rough..... | 18.00 | 18.00 |

A few changes have taken place in the prices of Portland cement but it happens that none of these effect the market points listed in the table below. The prices, per carload lots, not including package, are as follows:

| | | | |
|------------------|--------|--------------------|--------|
| New York..... | \$2.15 | Minneapolis..... | \$2.32 |
| Pittsburgh..... | 2.09 | Dallas..... | 2.03 |
| New Orleans..... | 2.40 | Denver..... | 2.24 |
| Chicago..... | 2.10 | San Francisco..... | 2.31 |
| Cincinnati..... | 2.37 | Montreal..... | 1.90 |



News of the Month



A train wrecker, Herbert Hale, 21 years old, was found guilty of murder in the court at Stanford, Ky., on November 14 and was sentenced to imprisonment for life. Hale had derailed a train of the Louisville & Nashville on September 5, causing the death of the engineman and the injury of 35 persons. Hale confessed and implicated another man, who is yet to be tried.

The Illinois Central has acquired by lease radio broadcasting station WGES, located at Oak Park, Ill. The station will present the usual programs of music and other entertainment with occasional features of particular interest to Illinois Central employees. The station may also be used in transmitting orders in case of a breakdown of telephone and telegraph lines such as was experienced last winter.

According to a bulletin recently issued by the Interstate Commerce Commission the total length of railroads in the United States operated under the block system on January 1, 1925, was 108,089.9 miles, of which 43,838.8 miles was automatic and 64,251.1 miles non-automatic signaling. These totals indicate an increase of 2,301.7 miles of automatic signals and a decrease of 113.4 miles of manual block signals.

The week ending November 14 was the seventeenth week during 1925 when car loadings exceeded the million mark. The total, 1,050,758, was the largest for the second week in November for any year since these statistics have been compiled. The cumulative total of the car loadings from the first of the year to November 14 is 45,498,413 cars, as compared with 43,169,496 cars in 1924 and 44,680,009 cars in 1923.

Freight traffic in September was the greatest for any September on record, according to reports compiled by the Bureau of Railway Economics, amounting to 41,322,180,000 net ton miles, which exceeded by 393,462,000 net ton miles or 1 per cent the previous high record for that month established in September, 1920. This also was an increase of 5.8 per cent as compared with September last year and an increase of 4.7 per cent over the same month in 1923.

Motor trucks are now used by 51 steam railroads for hauling freight on public highways. This statement is made by the National Automobile Chamber of Commerce, following an inquiry which was answered by about 200 railroads. This total compares with 22 truck lines a year ago. Twenty steam railroads now use 219 motor buses, and 190 steam and electric railroads use about 500 rail motor (gasoline) passenger cars. Many other roads are contemplating improvements of the kind here noted.

A broken rail, containing a transverse fissure was responsible for a train accident on the St. Louis-San Francisco near Victoria, Miss., at 6:35 a. m. on October 27, which resulted in the death of 18 persons. The train known as the Sunny Land, was enroute from Kansas City, Mo., to St. Petesburg, Fla. The large loss of life resulted from the fact that the rail which caused the derailment was located on a 40-ft embankment so that a part of the cars in the train rolled down the embankment, while others were thrown from a pile trestle.

The average daily mileage of freight cars in September was the highest for any September on record, according to reports filed by the carrier with the Bureau of Railway Economics. It was 30.7 miles per car day, which has been equaled only twice, in October, 1923, and October, 1924. Compared with the same month last year, the average for September was an increase of 1.8 miles, while it also was an increase of 1.5 miles over the daily average for September,

1923. The average load per freight car in September was 26.8 tons, a decrease of one-fifth of a ton under that for September last year.

The Railway Employees' Journal is offering prizes to railroad women for the best essay on what a railroad woman can do to help the railways in their competition with the motor bus and truck. This contest is a part of a campaign which is being conducted by the Benefit Association of Railway Employees. Three gold bracelet watches are being offered for the three best letters received. The contest is open to any woman whose father, husband, brother or son is an employee of a railroad of the United States. The essay must not exceed 1,000 words in length and must be sent to the editor of the Railway Employees' Journal, Chicago, before December 15.

Thirty-one Million Railroad Crossings Without an Accident," is the title of an advertisement which the Standard Oil Company of Indiana, Chicago, is publishing in newspapers in the West. During 1924 the vehicles operated by the Standard Oil Company crossed railroad tracks 31,000,000 times without an accident. This is an average of 85,000 crossing a day. This record is attributed to the effort on the part of the management to impress all employees with the need and desirability of careful driving. The company pointed out the dangers of careless driving and furnished placards reading: "This car stops at all railroad crossings." Each driver was asked to pledge himself to co-operate and to evidence his good intentions by displaying the placard on the rear of his machine.

Owing to the congestion of railway facilities in the state of Florida, an embargo has been placed on all freight moving into the state, which will be maintained until the situation has been improved by the release of loaded cars held at Jacksonville and other points north of Florida which cannot be moved into the state on account of the congestion. The embargo has also for its purpose the facilitating of a movement of citrus and other perishable traffic from Florida, which is heaviest during the early winter months. Exceptions to the embargo against movement into the state have been made in the case of livestock, perishables, petroleum products, foodstuffs, crate material and wrapping material for fruits and vegetables, fertilizers and fertilizer material.

The E. H. Harriman Memorial Medal for the best record in accident prevention among American railroads for the year 1924, offered through the American Museum of Safety by Mrs. Harriman, has been awarded to the Union Pacific System by the unanimous vote of the committee of award, according to Arthur Williams, president of the museum and chairman of the committee. Honorable mention was also made by the committee of the Delaware & Hudson and of the Duluth, Missabe & Northern, both of which roads have splendid records for the year. The silver replica of the Harriman gold medal, which is awarded to the division of a railroad making the best safety record, is given this year to the Western division of the Chicago Great Western. The members of the committee making the awards are as follows: R. H. Aishton, president, American Railway Association; Samuel O. Dunn, editor, Railway Age; John J. Esch, member, Interstate Commerce Commission; Julius H. Parmelee, director, Bureau of Railway Economics and Arthur Williams, vice-president—commercial relations, the New York Edison Company.

Personal Mention

General

C. H. Buford, who has been promoted to assistant general manager of the Eastern lines of the Chicago, Milwaukee & St. Paul, with headquarters at Chicago, entered railway service as draftsman in the bridge department of the Chicago, Milwaukee & St. Paul. Later he was appointed an assistant engineer on track elevation work and was subsequently promoted to engineer of track elevation. In April, 1917, he was transferred to the operating department as trainmaster of the Sioux City and Dakota division, and in February of the following year was transferred to the LaCrosse division, with headquarters at LaCrosse, Wis. Mr. Buford was promoted to superintendent of the Wisconsin Valley division, with headquarters at Wausau, Wis., in July, 1918, and in November of that year was transferred to the Superior division. He was transferred to the Sioux City and Dakota division in August, 1919, and to the Terre Haute division in September, 1921. In October, 1924, Mr. Buford was promoted to general superintendent of the Southern district, with headquarters at Chicago, where he remained until his recent promotion to assistant general manager.

John C. McClure, assistant to the president of the Southern Pacific, lines in Mexico, with headquarters at Tucson, Ariz., has retired on a pension after 32 years 3 months service. Mr. McClure entered the service of the Southern Pacific in May, 1893, as an office engineer on construction work. In September of that year he was transferred to the office of the division engineer of the San Joaquin division, with headquarters at Tulare, Cal., and in 1894 was again transferred to the division engineer's office at Los Angeles. He served as engineer maintenance of way on branch lines in Arizona and Mexico from 1904 to 1911, when he was appointed assistant general manager of these lines. He was appointed assistant to the president of the Arizona Eastern and the Mexican lines in July, 1913.

F. H. McGuigan, Jr., whose appointment as engineering assistant to the executive vice-president of the Gulf Coast Lines and the International-Great Northern, with headquarters at Houston, Tex., was announced in the last issue, was born on March 15, 1885, at Chillicothe, Mo., and graduated at the Massachusetts Institute of Technology in 1908. He entered railway service in July of that year in the engineering department of the Michigan Central, working on the Detroit River tunnel and terminal. He was appointed resident engineer on the Grand Trunk on the Toronto grade separation in 1910 and in 1912 was promoted to assistant engineer of construction at Montreal.

Mr. McGuigan was later promoted to assistant to the chief engineer and held that position until 1919, when he was appointed assistant engineer in the office of the regional director of the Central Western region of the United States Railroad Administration. He was promoted to regional engineer of the Central Western, Northwestern and Southwestern regions in 1920 in charge of liquidation of claims for way and structures. In 1923 Mr. McGuigan was appointed assistant to the president of the Railway Car Manufacturers' Association at New York, and he held that position until his recent appointment as engineering assistant to the

executive vice-president of the Gulf Coast Lines and the International-Great Northern.

M. J. Parr, who has been appointed superintendent of the Macon freight terminals of the Central of Georgia, has received much of his training in engineer work. He was born on September 5, 1884, at Chesterland, Ohio, was educated at Ohio State University. He entered railway service in June, 1904, on the Pennsylvania lines West, and during the summers of 1904 and 1905, and from June, 1906, to March, 1907, was assistant on the engineering corps of the same road. On March 18, 1907, he entered the service of the Central of Georgia as a draftsman at Savannah, Ga., which position he held until March, 1909, when he became an assistant engineer, with the same headquarters.



M. J. Parr

In May, 1914, he was promoted to pilot engineer, and in May, 1915, to supervisor of bridges and buildings of the Columbus division at Columbus, Ga., which position he held until January 1, 1917, when he became roadmaster of the Macon division at Macon, Ga. From June 26, 1918, to June, 1919, he was a first lieutenant with the 48th Engineers (overseas August, 1918, to May, 1919). From June, 1919, to October, 1919, he was assistant trainmaster at Macon and Columbus, and on the latter date became trainmaster of the Southwestern division at Macon, Ga., which position he was holding at the time of his recent appointment to superintendent of the Macon freight terminals.

H. D. Pollard, general manager of the Central of Georgia, with headquarters at Savannah, Ga., who has been elected vice-president and general manager, with the same headquarters, is a railway engineer by training. He was born on October 4, 1872, at Aylett, Va., and was educated at Aberdeen Academy, Va. He took a short course at the University of Virginia and entered railway service in 1892 as a rodman on construction work with the Baltimore & Ohio. In 1893 he was appointed assistant resident engineer of construction on the Ohio Southern (now a part of the Detroit, Toledo & Ironton) at Wells-ville, Ohio, and from 1894 to 1898 he was assistant engineer main-



H. D. Pollard

tenance of way on the Philadelphia division of the Baltimore & Ohio. The following year he served as transitman on the Central of Georgia, and in 1900 he was appointed resident engineer of construction, and subsequently served consecutively as supervisor of track, trainmaster, roadmaster and from June, 1905, to 1910, as superintendent at Macon, Ga., on the same road. In 1911 he was appointed assistant superintendent of the Sorocabana Railway, Sao Paulo, Brazil, and later was inspector general of the Auxiliare Company at Santa Maria and Porto Alegre, Brazil. In 1913 he returned to the service of the Central of Georgia as valuation engineer and two years later was elected president of the

Wrightsville & Tennille, with headquarters at Tennille, Ga. He was appointed assistant general manager of the Central of Georgia in 1918, and a short time later was promoted to general manager. Two years later he was appointed general superintendent, with headquarters at Savannah, Ga., and in February, 1924, was promoted to general manager, which position he was holding at the time of his recent election to vice-president and general manager.

Samuel M. Felton, president of the Chicago Great Western and an engineer by education and experience, was elected chairman of the board of directors, a newly created position, at a meeting of the board of directors held in Chicago on November 2. **Colonel N. L. Howard**, general manager of the Chicago Union Station Company, and also an engineer, was elected president of the Chicago Great Western, succeeding Mr. Felton.

Engineering

J. A. Dyer, division engineer on the Southern Illinois division of the Chicago & North Western, with headquarters at South Pekin, Ill., has been transferred to the Lake Shore division, with headquarters at Green Bay, Wis., succeeding **H. M. Spahr**, notice of whose death appears elsewhere in this issue. **C. H. Wells** has been appointed division engineer on the Southern Illinois division, with headquarters at South Pekin, Ill., succeeding Mr. Dyer.

W. A. Roderick, district roadmaster on the Wheeling & Lake Erie, with headquarters at Dillonvale, Ohio, has been promoted to engineer maintenance of way.

Track

N. A. Richards has been appointed roadmaster on the Western Pacific, with headquarters at Elko, Nev., succeeding **A. L. Harper**.

R. D. Dougherty, supervisor of track on the Minneapolis & St. Louis, at Ft. Dodge, Iowa, has resigned to accept a similar position on the Chicago Great Western at Des Moines, Iowa, succeeding **J. Kerrigan**, resigned.

H. L. Roblin has been appointed roadmaster on the Regina division of the Canadian National, with jurisdiction over the Lampman, Bengough and Bienfait sub-divisions, with headquarters at Radville, Sask., succeeding **S. K. Kimball**, transferred.

W. M. Bell, whose appointment as roadmaster of the Newport and Orford sub-divisions of the Canadian Pacific, with headquarters at Farnham, Que., was reported in the November issue, was born on May 29, 1885, at Thompsonville, Ont. From 1909 to 1910 he was employed with the Toronto Construction Company, in the latter year becoming a section laborer on the Canadian Pacific, which position he held for three years, when he was promoted to section foreman. He held this position and that of extra-gang foreman for 12 years, serving as extra-gang foreman at the time of his promotion to roadmaster.

James M. Harper, whose promotion to roadmaster of the Gulf & Ship Island, a subsidiary of the Illinois Central, with headquarters at Hattiesburg, Miss., was reported in the November issue, was born in 1874 at Burnesville, Miss., and entered railway service on June 15, 1889, as a laborer on the Yazoo & Mississippi Valley, also a subsidiary of the Illinois Central. From March 1, 1892, to July 15, 1904, he served as section and extra gang foreman, on the latter date being promoted to supervisor. He was holding this position at the time of his advancement to roadmaster.

G. B. Shouse, whose promotion to track supervisor on the Baltimore & Ohio, with headquarters at Flora, Ill., was reported in the November issue, was born at Salt Lick, Ky., on March 20, 1893, and graduated in civil engineering from the University of Kentucky in 1916, following which he entered railway service on the Kansas City Southern as a draftsman at Texarkana, Tex. He remained on that road until 1920, serving consecutively as transitman and assistant division engineer. From 1920 to 1923 he was an assistant on the engineering corps of the Baltimore & Ohio, serving at Flora, Ill., and at Washington, Ind., leaving that road

in the latter year to become assistant to the superintendent of the upper mills of the Jones & Laughlin Steel Company at Pittsburgh, Pa. He returned to the Baltimore & Ohio in 1924 as an assistant on the engineering corps, which position he was holding at the time of his promotion.

C. D. Turley, whose promotion to track supervisor in charge of a newly created subdivision on the Chicago Terminal division of the Illinois Central, with headquarters at Chicago, was reported in the October issue, was born at Walton, Ind., on January 28, 1886, and graduated in civil engineering from Purdue University in 1911. Before his graduation he worked for two years on county work, including drainage and hard road construction. He entered railway service on the Illinois Central in June, 1911, as a masonry inspector, being made field engineer in the Nonconah yard at Memphis, Tenn., in February, 1914, where he was engaged in the construction of yard extensions and mechanical facilities until January, 1915. From that date until March, 1917, he served as field engineer on the Kensington and Hyde Park track elevation in Chicago, being promoted to assistant engineer in the bridge section of the valuation department in the latter year. In June, 1921, he was appointed assistant engineer on the Chicago Terminal division, and on March 25, 1925, was promoted to office engineer, which position he was holding at the time of his promotion to track supervisor.

John H. Dunn, whose promotion to roadmaster of the Middle division of the Lake Erie & Western district of the New York, Chicago & St. Louis, with headquarters at Tipton, Ind., was reported in the October issue, was born at Corpus Christi, Tex., on October 22, 1883. From July, 1903, until February, 1906, he was employed by a contractor on the construction of the St. Louis, Brownsville & Mexico and the Trinity & Brazos Valley in Texas. In March, 1906, he became a track foreman for the Isthmian Canal Commission, later becoming general foreman. From September, 1909, to December, 1909, he served as a field foreman at Glendive, Mont., with the U. S. Reclamation Service on the Lower Yellowstone River project, and in January, 1910, returned to the Isthmian Canal Commission as a foreman and general foreman. In January, 1917, he became connected with the Walsh Construction Company, working on the New York Central freight terminal at Cleveland, where he held the positions of track foreman, general foreman and superintendent. In February, 1919, he entered the service of the New York, Chicago & St. Louis, as an extra gang foreman, being promoted in July to general foreman of the Cleveland division. In July, 1925, he was transferred to the Fort Wayne division, where he was located at the time of his promotion to roadmaster.

F. H. Sims has been appointed track supervisor on the Birmingham division of the Southern, with headquarters at Birmingham, Ala., succeeding **I. J. Holder**, who has been assigned to other duties. **W. K. Holland** has been appointed track supervisor on the Memphis division, with headquarters at Corinth, Miss., succeeding **R. W. Sneed**. Mr. Sneed has been in the service of the Southern for 40 years, and because of ill health has been assigned to lighter duties. **E. Bennett**, assistant engineer in charge of the engineering forces in the office of the engineer maintenance of way at Chattanooga, Tenn., has been appointed roadmaster of the New Orleans & North Eastern and the New Orleans Terminal, with headquarters at Hattiesburg, Miss. Mr. Holland was born at Oxford, Miss., on October 2, 1887, and on August 1, 1904, entered railway service as a section laborer on the Illinois Central, at Abbeville, Miss., being promoted to section foreman on November 6, 1908. He held this position until February, 1916, when he left the service of the Illinois Central to become a section foreman on the Southern at Moscow, Tenn., where he remained until June 28, 1916, when he was transferred to a section at LaGrange, Tenn. On November 28, 1917, he returned to Moscow and in March, 1916, was employed as a fireman for the same road. He again became a section foreman in July of the same year, which position he was holding at the time of his promotion to track supervisor.

Mr. Bennett was born on May 26, 1886, at Irvington, Ky., and graduated from the Kentucky State University in 1909.

He entered railway service on September 1 of that year on the Southern, serving as a rodman and transitman until September 1, 1912, at which time he was promoted to assistant engineer, holding this position until February 1, 1917, when he was made resident engineer on the Southwestern district. When this position was abolished on April 1, 1920, he was again made assistant engineer, which position he was holding at the time of his promotion to roadmaster.

William White, roadmaster on the Chicago & North Western, with headquarters at Belvidere, Ill., retired from active service on November 1, at the age of 70 years after serving that road continuously for 53 years 7 months. **M. J. Fayram**, roadmaster at Clinton, Iowa, has been transferred to Belvidere, succeeding Mr. White. **James Watt**, roadmaster on the Northern Iowa division at Eagle Grove, Iowa, has been transferred to Clinton in place of Mr. Fayram. **A. J. Wise**, acting roadmaster at Clinton, Iowa, has been transferred to the Northern Iowa division, with headquarters at Eagle Grove, Iowa, succeeding Mr. Watt. Mr. White was born at Sherbrooke, Que., on March 9, 1855, and entered railway service on the Chicago & North Western on March 1, 1872, as a section laborer at Belle Plaine, Iowa. He was promoted to section foreman on May 6, 1877, serving in this capacity at various points until October 3, 1887, when he became extra gang foreman on second track construction and in charge of rail laying gangs. He held this position until 1899, when he was promoted to general foreman on second track work in Iowa and Wisconsin, also working on track elevation in Chicago in 1902. He was promoted to roadmaster on the Chicago terminal in 1902, later serving in the same capacity at Belvidere, Ill.; Carroll, Iowa; Sterling, Ill., and again at Belvidere where he was located at the time of his retirement.

E. M. Wilkin, section foreman on the Minneapolis & St. Louis, with headquarters at Bartlett, Ill., has been promoted to track supervisor on the Third district of the Central division, with headquarters at Estherville, Iowa, succeeding **E. H. Griffin**, retired. **Frank Svec**, section foreman at Waterville, Minn., has been promoted to track supervisor on the First district of the Central division, with headquarters at Ft. Dodge, Iowa, succeeding **J. W. Hruska**, who has been transferred to the Second district of the Central division, with the same headquarters, succeeding **R. O. Dougherty**, who has resigned to accept a position on the Chicago Great Western as noted elsewhere. Mr. Wilkin was born on September 24, 1874, at Clinton, Iowa, and entered railway service as a section laborer on the Minneapolis & St. Louis on April 12, 1897. On April 9, 1899, he was given charge of a section, serving as section foreman for 14 years before he resigned. He was superintendent of a zinc and lead mine at Galena, Kan., for three years, following which he returned to the Minneapolis & St. Louis as a section foreman. He was promoted to extra gang foreman and held this position for five years, until his promotion to roadmaster.

Obituary

A. A. Wolf, chief carpenter of the Chicago, Milwaukee & St. Paul at Portage, Wis., died on October 29 as the result of heart trouble. Mr. Wolf was for a long time district carpenter at Milwaukee, Wis.

H. M. Spahr, division engineer of the Chicago & North Western, with headquarters at Green Bay, Wis., died on October 29 as a result of a stroke of paralysis. Mr. Spahr was born on December 22, 1874, at Indianapolis, Ind., and graduated from Purdue University in 1897, following which he became a rodman with the South Park Commissioners of Chicago. In 1898 he became a chainman on the Union Pacific, in November of that year entering the service of the Chicago & North Western as a chainman at Milwaukee, serving at various points as rodman, instrumentman and assistant engineer. On April 21, 1918, he was transferred to the engineering staff of the regional director of the United States Railroad Administration, North Western region, and on March 1, 1920, was appointed division engineer on the Lake Shore division of the Chicago & North Western, at Green Bay, Wis., where he was serving at the time of his death.

Construction News

The Atchison, Topeka & Santa Fe will construct approximately 6 miles of second track between Phoenix, Ariz., and Glendale, at a cost of \$340,000, and a 500 ft. extension of the icing dock at Glendale.

The Atlantic Coast Line has completed securing the right of way from the end of its Thomasville branch in Georgia to Perry, Fla., a distance of 40 miles, which will open a new through line from Tampa and other west coast Florida cities to the middle and northwest by Albany and Atlanta and with the Louisville and Nashville, by Montgomery and Chattanooga. The contract for its construction will be let as soon as authority is granted by the Interstate Commerce Commission.

The Baltimore & Ohio has awarded a contract to Joseph E. Nelson & Sons, Chicago, for the construction of water treating plants at DeForest Junction, Ohio, and at Athens, to cost approximately \$18,000.

The Canadian National has awarded a contract to the Jamieson Construction Company, Edmonton, Alta, for the laying of 7,700 ft. of pipe line at New Brighton, Alberta, and for the construction there of a frame pump house on a concrete foundation.

The Central of New Jersey has awarded contracts to Anderson & Wheeler, Inc., for the construction of a highway underpass and approaches thereto (exclusive of bridge steel and deck) at Hudson county boulevard, Bayonne, N. J., at an estimated cost of \$155,466; and for a similar structure at Avenue A in the same city, to cost \$130,269. This company is planning to construct an engine terminal at Bethlehem, Pa.

The Chesapeake & Ohio has awarded a contract to the Railroad Water & Coal Handling Company, Chicago, for the construction of a pumping plant at Stevens, Ky. The same contractor has been awarded a contract for the reconstruction of a water treating plant at Stevens at a cost of \$45,000, and for the construction of a pumping plant at Edgington, Ky. A contract for the construction of a coaling station at Olive Hill, Ky., has been awarded to the T. W. Snow Construction Company, Chicago.

The Chicago & North Western has received bids for the construction of an enginehouse at Aberdeen, S. D. Relocation of the line of this company in the vicinity of Shorewood, just north of Milwaukee, Wis., at a cost of approximately \$1,000,000 has been authorized.

The Chicago, Burlington & Quincy has awarded a contract to Hyde & Co. for the construction of a structural steel and concrete railway mail building at Omaha, Neb. The building will be four stories in height and its dimensions will be 119 ft. by 264 ft.

The Chicago, Milwaukee & St. Paul has been authorized by the Interstate Commerce Commission to construct a 13-mile extension of its Big Black Foot branch in Montana at an estimated cost of \$170,935.

The Chicago, North Shore & Milwaukee (Electric) is preparing plans for the construction of a motor bus terminal at Libertyville, Ill., which is estimated to cost over \$100,000.

The Chicago, Rock Island & Pacific is receiving bids for the construction of a two-story freight house, 40 ft. by 260 ft. at Kansas City, Mo. Additions to the machine shop, engine house and other terminal buildings at Dalhart, Tex., are under construction, at a cost of \$100,000.

The Denver & Rio Grande Western has awarded a contract to A. Danielson & Son, Denver, Colo., for the construction of a two-story, reinforced concrete and steel addition to the company hospital at Salida, Colo., to cost \$124,000. This company's line from Helper, Utah, to Kenilworth, a distance of six miles, will be relocated to reduce grades. Expenditures for improvements in 1926 are contemplated as follows: Elimination of grade crossings and changes in grades, \$452,000; additional yard tracks, \$314,000; station buildings, \$82,000; fuel and water stations, \$50,000; shop buildings, \$63,000; extensions, \$1,229,000.

The Grand Trunk Western has awarded a contract to the Hamer Paskins Company Inc., Chicago, for the construction of a 147-ft. bridge with three-deck plate girder spans over the Clinton river near Romeo, Mich., to cost approximately \$40,000. Plans have been prepared for the construction of an 80 ft. span bridge with approaches over the Black river at Port Huron, Mich., to cost approximately \$250,000. A roundhouse will be constructed at Pontiac, Mich.

The Golden Belt's application for permission to construct a railway in central western Kansas from Great Bend to Hays, 52 miles, and also of later continuing to Phillipsburg, 50 miles further north, has been denied by the Kansas Public Service Commission. The refusal of permission was made on the grounds that the Interstate Commerce Commission has sole authority to act on the matter.

The Great Northern has awarded a contract for the construction of a two-story motor bus garage and machine shop, 100 ft. by 228 ft., at Minneapolis, Minn.

The Guyandot & Tug River, a subsidiary of the Norfolk & Western, has applied to the Interstate Commerce Commission for a certificate authorizing the construction and operation of a new line from a connection with the Virginian at Elmore, W. Va., to Gilbert and Wharnccliffe, W. Va., 53 miles, connecting at the latter point with the Norfolk & Western, which has an application pending for authority to acquire control of the Virginian by lease.

The Hampton & Branchville has been authorized by the Interstate Commerce Commission to construct a line from a point five miles east of Smoaks, S. C., to Cottageville, 18 miles. The cost of the extension, including necessary equipment, is estimated at \$173,462.

The Louisville & Nashville has asked the Interstate Commerce Commission for an extension of time to February 1, 1926, in which to file with the commission an application for authority for the construction of the proposed extension between its McRoberts line and its Harlan County branch and the Carolina, Clinchfield & Ohio, which was required as one of the conditions in the commission's order authorizing the acquisition of control of the C. C. & O., by the Atlantic Coast Line and the Louisville & Nashville. The application says that additional time is needed for the engineering work necessary to decide on the route to be selected.

The Missouri-Kansas-Texas is constructing an additional unit in the car shops at Denison, Tex., consisting of a steel frame, covered shed, 56 ft. by 350 ft., with 20-ton and 5-ton cranes traveling the length of the buildings, and with a 200-ft. extension of the craneway outside of the building. The shed will cost complete, including machinery, approximately \$130,000. The contract for the steel frame was awarded to Stupp Bros., St. Louis, Mo.

The New York, Chicago & St. Louis has received bids for line changes in the vicinity of Sorento, Ill. The project involves realignment for a distance of approximately 2 miles to eliminate curves and will cost approximately \$175,000.

The New York, Pittsburgh & Chicago has filed with the Interstate Commerce Commission, through its counsel, H. O. Evans, a brief of exceptions to the report proposed by Examiner Burnside recommending against the granting at this time of this company's application for a certificate authorizing the construction of the proposed line from Allegheny to Easton, Pa.

The Northern Pacific has awarded a general contract for the construction of a 50-mile branch line from Orofino, Idaho, into the Clearwater timber district of northern Idaho to Twohy Bros., Spokane, Wash. This project was reported in the October issue.

The Pennsylvania has prepared plans for the construction of a double track bridge over the Sandusky river at Tiffin, Ohio. This is part of the second-track construction project now under way in the vicinity of Tiffin. A contract has been awarded to P. T. Clifford & Son, Valparaiso, Ind., for the construction of a second track and change of grade between St. Jacob, Ill., and Pierron (10.3 miles) at a total estimated cost of \$900,000. A contract has been awarded to the T. J. Foley Company, Pittsburgh, Pa., for the construction of a bridge to carry the company's tracks over entrance road,

Camden, N. J., the approach to the new highway bridge across the Delaware river at an estimated cost of \$100,000.

The Southern plans to rebuild the office section of the freight station at East St. Louis, Ill., which was damaged by fire on October 19 with a loss estimated at \$75,000. This company is building an extension to its yard at Citico (Chattanooga), Tenn., involving the laying of 20 miles of new track. The work also includes a two-story frame yard office, two track scales and an icing platform 527 ft. long. The total cost of the work will be approximately \$1,000,000. Plans are being prepared for the construction of a viaduct to carry Third street, Chattanooga, across the company's tracks.

The Southern Pacific will construct a classification yard at Fresno, Cal., at a cost of approximately \$650,000. The contract for the grading and construction of buildings with the change of line on the Galveston, Harrisburg & San Antonio between Langtry, Tex., and Osman, reported in the October issue, has been awarded to the List Construction Company, Kansas City, Mo. The cost of the entire work, including track, station buildings, water and fuel oil facilities and signals, is estimated at approximately \$1,000,000.

The Terminal Association of St. Louis has been authorized by the Missouri Public Service Company to construct a reinforced concrete viaduct over the Belt line in Penrose Park, St. Louis, Mo., at a cost of \$213,600, of which the Terminal Railroad Association will pay \$125,000.

The Union Pacific has awarded a contract to the Utah Construction Company for grading and culvert work in the construction of 26 miles of second track from Echo, Utah, to Gateway, a distance of 26 miles. The contract for the construction of a freight and passenger station at Bell, Cal., has been awarded to C. A. Poulson, Beverly Hills, Cal. The city of Denver, Colo., and this company will jointly construct a subway at Thirty-eighth street in Denver.

The Wabash has awarded a contract for the construction of a roundhouse and machine shop at North Kansas City, Mo., reported in the September issue, to Carmichael & Cryder, Kansas City Mo. The project will cost approximately \$100,000. A contract has also been awarded to the Roberts & Schaefer Company, Chicago, for the construction of a coal- ing station at St. Louis, Mo., to cost \$35,000.

Equipment and Supplies

Orders for rail recently placed by the railroads for their 1926 requirements include the following:

| | Tons | |
|------------------------|--------|----------------------------------|
| A., T. & S. F. | 10,000 | Illinois Steel Company |
| | 10,000 | Inland Steel Company |
| | 76,000 | Tennessee Coal, Iron & R. R. Co. |
| Chesapeake & Ohio | 12,000 | Illinois Steel Company |
| | 12,000 | Inland Steel Company |
| Erie | 6,000 | Bethlehem Steel Company |
| | 6,000 | Illinois Steel Company |
| Grand Trunk | 8,000 | Bethlehem Steel Company |
| | | Illinois Steel Company |
| Kansas City Southern | 3,000 | Bethlehem Steel Company |
| | 1,000 | Inland Steel Company |
| | 2,000 | Illinois Steel Company |
| | 72,000 | Bethlehem Steel Company |
| | 57,000 | Carnegie Steel Company |
| Pennsylvania | 22,000 | Illinois Steel Company |
| | 9,000 | Inland Steel Company |
| Reading | 30,000 | Bethlehem Steel Company |
| | | Carnegie Steel Company |
| | 2,380 | Inland Steel Company |
| St. Louis Southwestern | 4,120 | Illinois Steel Company |
| | 10,900 | Tennessee Coal, Iron & R. R. Co. |
| | 10,500 | Illinois Steel Company |
| Wabash | 6,500 | Inland Steel Company |
| | 3,000 | Bethlehem Steel Company |

The Baltimore & Ohio is inquiring for 3,000,000 tie plates.

The Chesapeake & Ohio has ordered two ditchers from the American Hoist & Derrick Company.

The Chicago & Eastern Illinois is inquiring for 7,500 tons of rail.

The Missouri-Kansas-Texas is expected to enter the market for 12,000 tons of rail.

The Norfolk & Western will buy 5,000 tons of 130-lb. rail.

The Pere Marquette is inquiring for 12,000 tons of rail.

The St. Louis-San Francisco is inquiring for 30,000 tons of 100-lb. rail and 4,000 tons of 90-lb. rail.

The Wabash is inquiring for 15,000 tons of rail.

Supply Trade News

General

The **Sullivan Machinery Company** has moved its Sydney, New South Wales, office from Australia Chambers, 3 Martin Place, to the Kembala building, Margaret street.

A. O. Norton, Inc., Boston, Mass., has opened an office at 2838 Grand Central Terminal in charge of **H. J. Wilson**; and another at 421 Chestnut street, Philadelphia, in charge of **O. L. Wright**.

A merger of the **Kokomo Steel & Wire Company** and the **Keystone Steel & Wire Company**, Peoria, Ill., has been ratified by the stockholders. The details of the new organization have not been definitely decided upon.

At the annual meeting of the **Portland Cement Association** which was held in Chicago on November 18 and 19, the following officers were elected: President, **Blaine S. Smith** (re-elected); first vice-president, **L. R. Burch**, vice-president of the **Atlas Portland Cement Company**; second vice-president, **C. A. Irvin**, vice-president of the **Alpha Portland Cement Company**, and treasurer, **John W. Boardman** of the **Huron & Wyandotte Portland Cement Company**.

The business of **Wadsworth, Howland & Co., Inc.**, paint and varnish manufacturers, Boston, Mass., has been transferred to **Devoe & Reynolds Company, Inc.**, New York. President **E. S. Phillips** of **Devoe & Reynolds** becomes the new president of **Wadsworth, Howland & Co.**, succeeding **A. P. Felton**, who is retiring both from the presidency and the board of directors. **Wadsworth, Howland & Co.** will be operated as a separate manufacturing and sales unit of the **Devoe** organization, and more capital has been added to the corporation to permit an expansion of facilities. The new board of directors is composed of **E. S. Phillips**, **E. D. Peck**, **Renshaw Smith, Jr.**, **E. S. Blackledge**, **A. C. Stephan**, **E. B. Prindle**, **G. E. Felton**, **F. H. Appleton** and **C. S. Robbins**.

Personal

Clyde L. Jones has joined the sales force of the **Reading Iron Company**, Reading, Pa., at St. Louis.

Andrew Glass, vice-president of the **Wheeling Corrugating Company**, Wheeling, W. Va., died on November 22, after a few hours illness.

Charles B. Ashmead has been appointed sales representative of **S. F. Bowser & Co., Inc.**, Ft. Wayne, Ind., with headquarters at Cleveland, O.

Homer D. Williams, president of the **Carnegie Steel Company**, Pittsburgh, Pa., has resigned to become president of the **Pittsburgh Steel Company**.

F. W. Stubbs, formerly mechanical engineer of the **Chicago Great Western**, has been appointed railroad representative of the **A. M. Byers Company**, Pittsburgh, Pa. Mr. Stubbs will be located in Chicago.

F. M. Cross, manager of the pneumatic tool department of the **Ingersoll-Rand Company**, with headquarters at New York City, has been appointed manager of the pneumatic tool department for the Chicago territory, with headquarters at Chicago.

L. F. Wilson, vice-president of the **Bird Archer Company**, with headquarters at Chicago, has been promoted to vice-president and general manager, with the same headquarters, and will have jurisdiction over production and operation including sales and service.

C. L. Wood, assistant general manager of sales of the **Carnegie Steel Company**, Pittsburgh, Pa., has been appointed general manager of sales, to succeed **William G. Clyde**, recently appointed president of the company. **Samuel R. Hoover** has been appointed assistant general manager of sales in charge of the bureau of bars and hoops, to succeed Mr. Wood.

George S. Sangdahl, district sales manager of the **Horton Steel Works, Ltd.**, a subsidiary of the **Chicago Bridge & Iron Works**, with headquarters at Montreal, Que., has been trans-

ferred to the newly opened office of the latter company at 963 Union Trust building, Cleveland, Ohio, as district sales manager. The territory of this office will include Ohio, West Virginia, Kentucky, east of Frankfort, New York, Pennsylvania, and part of Maryland.

Horatio S. Schroeder, general sales manager of the **Interstate Iron & Steel Company**, Chicago, has been promoted to vice-president in charge of sales. He entered the employ of the **Interstate Iron & Steel Company** in 1915 as manager of the New York office and in March, 1923, was transferred to the Chicago office as division sales manager. In September, 1924, he was promoted to general sales manager, which position he has held until his recent promotion.

E. A. Condit, Jr., sales manager of the **Rail Joint Company**, New York, who has been elected vice-president in charge



E. A. Condit, Jr.

of sales, with headquarters as heretofore at New York, graduated from **Stevens Institute of Technology** in 1902. Mr. Condit entered the service of the **Continuous Rail Joint Company of America**, at Newark, N. J., as a draftsman. He subsequently served through various inspection departments and then was assistant superintendent at the **Troy mill**, Troy, N. Y. About 1906, he opened a sales office in the **Oliver building**, Pittsburgh, Pa., and in 1918 he became sales manager of the **Rail Joint Company**, the position he held at the time of his advancement to vice-president.

William G. Clyde, senior vice-president and general manager of sales of the **Carnegie Steel Company**, Pittsburgh, Pa., has been elected president. Mr. Clyde was born in Chester,



W. G. Clyde

Pa., he attended the public school of Chester and later entered the **Pennsylvania Military College** graduating with the class of 1888. He began work as civil engineer with **Ryan & McDonald**, constructors, of Baltimore, Md., and later became associated with **Robert Wetherill & Co.**, machinists and founders of Chester. Mr. Clyde began his mill training with the **Wellman Steel & Iron Company** at Thurlow, Pa., as superintendent of the plate mills, subsequently going to the **Illinois Steel Company**, at South Chicago, where he remained for six years. He was then appointed sales manager for the **American Steel Hoop Company** at Philadelphia, remaining in that position until this firm was taken over by the **Carnegie Steel Company**. After serving three years in sales work at the Cleveland office, Mr. Clyde was appointed assistant general sales manager of the **Carnegie Steel Company**, with headquarters at Pittsburgh, and in March, 1918, he was made vice-president and general manager of sales of this company.

William M. Zintl, of the advertising sales department of the **Curtis Publishing Company**, has been appointed director of sales of the paint and varnish division of the paint, lacquer and chemicals department of **E. I. du Pont de Nemours & Co.** Mr. Zintl entered the service of **Harrison**

Brothers Co., Inc., of Philadelphia, in 1902 as an office boy, and was steadily advanced until he became advertising manager. In 1917 this company was taken over by the du Pont company. In 1910 he became manager of sales of the New York branch of John Lucas & Co., Inc., holding this position until 1912. From that date until 1915 he was New England division manager for this company, in the latter year being transferred to the home office at Philadelphia in the sales and advertising department. In 1919 he joined the staff of the Curtis Publishing Company, and was acting as district manager for the Philadelphia and Southern territory of the advertising sales department at the time of his appointment by the du Pont company.

G. W. Mead, president of the Linde Air Products Company, New York, has been elected chairman of the board; **W. F. Barrett**, vice-president, has been elected president; **R. R. Browning** has been elected vice-president in charge of sales activities and **J. A. Rafferty**, vice-president in charge of engineering, manufacturing and research.

M. J. Carney, president of the Prest-O-Lite Co., Inc. New York has been elected chairman of the board; **William F. Barrett**, vice-president, has been elected president; **Ralph R. Browning** has been elected vice-president in charge of acetylene sales activities and **R. J. Hoffman** has been re-elected vice-president in charge of storage battery and automotive divisions.

Benjamin Bruce Shaw, formerly chief engineer of the Cuba railroad, has been appointed contracting engineer of the **Roberts & Schaefer Company**, Chicago. He was born on February 21, 1886, at Canton, Ill., and graduated from the University of Illinois in 1911 with the degree of Bachelor of Science of Railway Civil Engineering. In 1916 he returned to the University of Illinois and received the degree of Civil Engineer. He entered railway service in 1911 as a rodman on the Chicago Rock Island & Pacific on the construction of a cut-off from Des Moines, Ia., to Alorton, then known as the St. Paul & Kansas City Short Line. Later he was promoted to assistant engineer in charge of construction.

He was transferred to El Reno, Okla., as assistant engineer on maintenance work and a year later was promoted to division engineer of the Indian Territory division, with headquarters at Haileyville, Okla. In 1916 he was transferred to the Arkansas division, with headquarters at Little Rock, Ark., and when the Louisiana division was consolidated with the Arkansas division was made division engineer of the Arkansas-Louisiana division. In December, 1922, he was appointed chief engineer of the Cuba railroad on the island of Cuba, which position he held until his recent appointment.



Benjamin B. Shaw

Trade Publications

Galvanum Paint.—A color card and a folder descriptive of Galvanum paint, have been issued by the Goheen Corporation of New Jersey, Newark, N. J. This paint is applied directly to galvanized iron without the aid of an acid wash or primer of any sort, and no weathering of the metal is necessary.

Tank Protection.—Hill Hubbell & Company, San Francisco, Cal., has issued 19 loose-leaf sheets enclosed in a binder which illustrate and describe the purposes and uses of Bitulumin and other protective coatings manufactured by that company for use on metal and concrete tanks serving as containers for water, oils, chemicals, gas, etc. The various materials are described and specifications are presented for

their use and application on tanks and containers for various purposes. Special insert sheets show illustrations of structures coated with the various materials.

"Turbinair" Hoist.—The Sullivan Machinery Company, Chicago, has issued bulletin No. 76-F which describes an interesting form of hoist operated by compressed air. It is operated by a "turbinair" motor which is an air motor of the rotary type. The bulletin is in the form of a technical discussion, with photographs, drawings and diagrams illustrating the principles, as well as the application of this device to various uses.

Tentative Standards.—The Clay Products Association, Chicago, has issued a 24-page bulletin giving drawings and tables showing the dimensions and weights of standard designs of vitrified salt glazed clay sewer pipe and the various tees, wye-branches, and other specials used in connection therewith. The object of this publication is to promote the use of these standard designs as a means of encouraging simplified practice and effecting the economy of manufacture in this field.

Reliable Power.—The Novo Engine Company, Lansing, Mich., has issued a loose leaf catalog of the products of that company. The sheets cover detailed descriptions of the one, two and four cylinder gasoline-engines, together with diagrams, charts and photographs. This is followed by pages devoted to various applications of this equipment with units supplied by the manufacturer. These include various types of hoists, trench pumps, water service pumps of various models, etc.

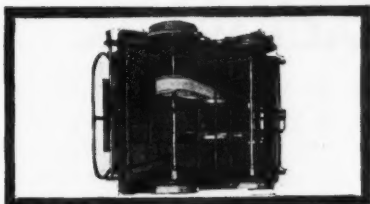
Hayward Buckets.—The Hayward Company, New York, has issued bulletins No. 650 and 655, illustrating and describing clamshell and orange peel buckets manufactured by that company. These bulletins, which are prepared in uniform style, describe the several types of buckets of each class, outline the particular service to which they are best adapted and make specific reference to special details of the buckets upon which the manufacturer lays particular stress. Several pages of illustrations show the buckets in actual use.

Power Shovels.—The Orton & Steinbrenner Company has issued bulletin No. 39 comprising 14 pages devoted to the $\frac{1}{2}$, $\frac{3}{4}$ and 1-cu. yd. power shovels manufactured by that company. The first three pages are devoted to descriptions and illustrations of the various mechanical parts of the shovel, while the remaining pages are devoted to illustrations, tables and diagrams showing the application of these shovels to various classes of work. The diagrams in particular will prove of value to the users of shovels as showing the working dimensions, reach, depth of cut, etc., to which the three sizes are best adapted.

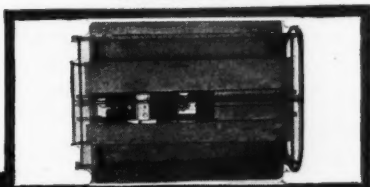
Dimension and Load Bulletin.—The Hyatt Roller Bearing Company, Newark, N. J., has issued bulletin No. 1559 which outlines a method for determining the proper sizes and types of Hyatt roller bearing to be used in the various classes of service to which these bearings are applied. The bulletin gives detailed explanations of the effect of speed, shaft hardness, nature of service, etc., on the selection of the bearings and develops a formula for making this selection. This formula is expressed in the form of a series of eight pages of tables giving dimensions to the bearings and the basic capacities at various speeds, ranging from 25 to 1,000 r. p. m. Three examples are also given to show how these tables should be used.

Water Softening.—The National Lime Association, 918 G street, Northwest, Washington, D. C., has issued a 48-page booklet describing the use of lime in water softening and purification. The booklet, which is a technical presentation of the subject, is divided into four chapters, (1) a discussion of the advantages of the use of lime in water treatment by C. P. Hoover, Columbus, Ohio, (2) an analysis of the cost of impurities in locomotive water supply and the value of water treatment, taken from the 1925 report of the Water Service Committee of the American Railway Engineering Association, (3) a discussion of raw water ice, and (4) a discussion of variance from accepted formulae in water flows. This booklet, and particularly the first two chapters, contains information of value to railway engineers responsible for the provision of locomotive water supply.

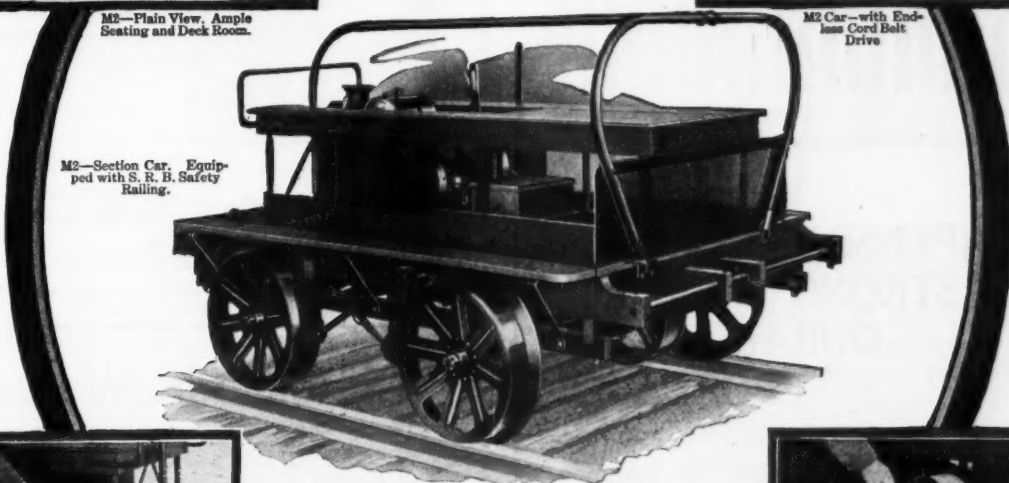
Setting the Pace of Progress In Motor Car Design



M2 Frame Well Braced in All Directions. Note Thrust Collars on Axles.

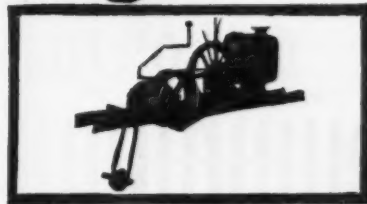


M2—Plain View. Ample Seating and Deck Room.

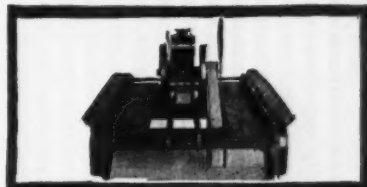


M2—Section Car. Equipped with S. R. B. Safety Railing.

Fairmont leads in scientific research and development work on track motor cars. No expense is spared whose entailment promises a still wider margin of comfort, safety and economy. Extensive investigations and tests that others might consider too costly or unnecessary are being made daily by Fairmont Engineers.



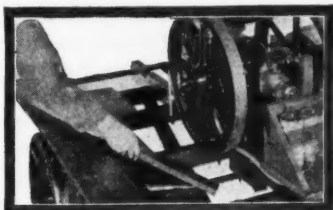
ET2—QHB—with Endless Cord Belt and Two Speed Transmission.



M2 Car—with Endless Cord Belt Drive



Handy Tool Box—Large enough and deep enough for all Tools and Oil Cans.

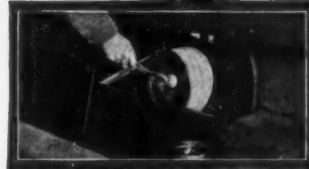


Floor Board Removable—to permit easy access to Flywheel without loosening Engine Bolts.

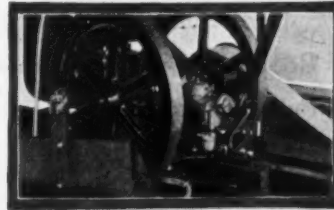
As a consequence, Fairmont Railway Motor Cars are always first with improvements—many of which are later imitated by the industry at large. Outstanding examples of Fairmont leadership in motor car design are the 3-Bearing Ball Bearing Crankshaft, the Throttle Control, the Belt Drive and the Unit Construction of the power plant which assures ready accessibility of all parts.

The Fairmont MT-2 Extra Gang Car is an M-2 Car Equipped with a 2-speed Motor Car Transmission.

Fairmont Railway Motors, Inc.
Fairmont, Minn.



Quick Detachable Pulleys—Make possible the use of Drive Pulley best suited for work at hand.



Note Several Notches in Sliding Base Link for Belt "Take-up" and Pulley Change.

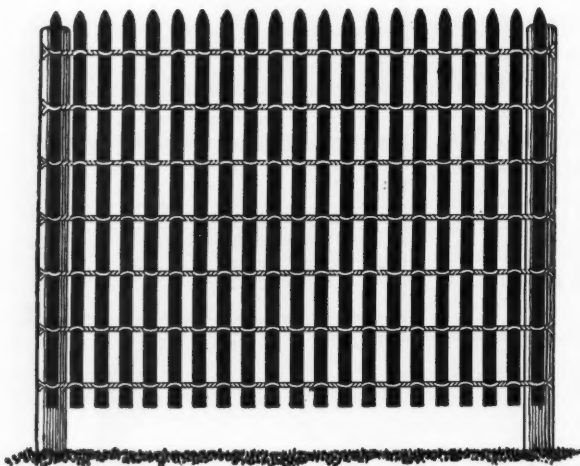
**Performance
on the Job
Counts**

Fairmont

Ball Bearing Engines and Railway Motor Cars

District Sales Offices:
New York
Chicago
St. Louis
San Francisco
Washington, D.C.
Winnipeg, Can.

"Big Red" Snow Fence 6'-0" High



INEXPENSIVE STRONG DURABLE PORTABLE

Quickly and easily erected by common labor in the fall.

Equally easy to take down and store during the spring and summer.

First cost about one-half that of any snow break built out of lumber.

Good for 15 years continuous service.

Put up in rolls of 80 ft. each—weight 450 lbs.

Made with genuine "Galvannealed" wire.

PREVENTS DRIFTS

For further information address

ILLINOIS WIRE & MFG. CO.

Main Office

Joliet, Illinois

~~WILLARDTON~~ ~~WHARTON~~

TRACKWORK

IS KNOWN the world over—for since the beginning of the railroad industry this company has been inseparably associated in the design and application of better track work.



The severest pounding of modern power only serves to demonstrate the greater endurance of Wharton equipment.

We are prepared to furnish designs suited to individual standards of railroads or special designs as requested. Switches — Frogs — Crossings—of TISCO Manganese Steel.

Wm. Wharton Jr. & Co., Inc.
Easton, Pa.

Lime-Soda Water Softeners

We make LIME-SODA WATER SOFTENERS of both the ground operated and top operated types to purify water for prevention of scale deposits and corrosion in locomotive boilers.

The saving that is being effected by purifying water is most ably portrayed in the recent report of the Water Service Committee at this year's Chicago Convention of the American Railway Engineers' Association. We recommend this report for your careful consideration.

Write for our literature which gives, in detail, the results of our twenty-three years' experience in furnishing WATER SOFTENER PLANTS to twenty-six American Railroads.

American Water Softener Company
Fairhill P. O. Philadelphia, Pa.

Specialists for twenty-three years in Railroad

Water Purification



DIXON'S

SILICA-GRAPHITE

PAINT

because of its better protective qualities, makes frequent repainting unnecessary and so gives better protection at less cost.

It is a natural combination of flake silica-graphite, mined only by ourselves. The vehicle is the best linseed oil obtainable.

Dixon's Silica-Graphite paint will not peel, crack or flake off because of the natural elasticity of the flake graphite, while the silica is an anchor that withstands wear.

It is made in **FIRST QUALITY** only with a reputation for economy covering a period of 50 years.

Write for Booklet No. 187-B and long service records

JOSEPH DIXON CRUCIBLE CO.,
Jersey City, New Jersey
Established 1827




You need Bloxham Track Liners

FOR speed, for ease of operation, for labor saving and for minimum disturbance of grade, Bloxham Track Liners have proved in competitive tests that they are superior. Three ordinary section hands with Bloxham Track Liners can get results in track shifting that would require eight to eleven men using the old lining bar method. And they can do the work easier because the Bloxham operates with a pull where the weight of the body can be used instead of requiring a dead lift. Maintenance executives are invited to write for details and prices.

Chicago Steel Foundry Co.
Kedzie Avenue & 37th Street, Chicago

Hubbell & Sharp. W. R. McDonough & Co.,
1216 Chemical Bldg., St. Louis, Mo. National Bldg., Cleveland, O.

BLOXHAM

Track Liners



REAM12-I-BTG



How Many Pumpers on your division?

How many hours or days per month do they work to keep up your water service?

How many orders a year does your dispatcher send to trainmen "Water Station 123 out of order; take from No. 127"?

SULLIVAN AIR LIFT


is trouble free; and secures maximum output from your wells at all times.

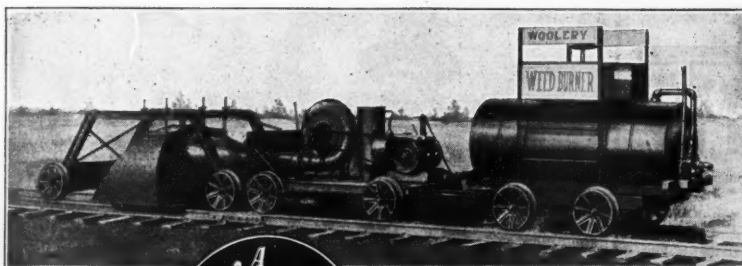
There are no moving parts in the well. Remote control and automatic stop and start systems are available, reducing labor almost to 0.

The station agent at Telford, Pa., on the P. & R., 3,600 feet away from the well house, presses a button to stop or start pumping. The tank is 530 feet from the well house.

This little plant is automatic, save for an occasional track-walker's visit to fill the lubricators. It is furnishing the same amount of water per minute as when installed in 1920.

Ask for special Railroad booklet, No. 19129.





A Two-Man Outfit
of Guaranteed Efficiency
Average cost on first heads burning
(as shown)
\$300 per mile

Woolery Railway Weed Burners

(Patent Applied For)

There is no question but that it has saved this company a great deal more than the price of the machine just in this season.

H. P. STAFFORD

Asst. Gen. Roadmaster, D.S.S. & A. Ry.

A Self-propelled, three-unit outfit operated by two men. Speed from 1 to 5 miles per hour for burning, and up to 20 miles an hour for traveling. Compared with large and cumbersome machines, the Woolery is light—quick—nimble. Being easy to handle and quick to fire it gets around and can be used in places and on short burnings where other machines would be impractical. It may be removed from track at highway crossings. Total length of outfit, about 34 feet.

Always Ready for a Demonstration on any Railroad High Lights on the Woolery Weed Burner

Note the clean, wide burned area that the Woolery leaves behind. In some places the weeds and quack grass had attained a height of 27 inches.

Burns Gas Oil, Distillate Oil or Kerosene, and fire starts instantly.

ONE large Oil Burner—never whips out by tall weeds.

Burns a strip 11 feet wide.

Average burning rate, 2 miles per hour.

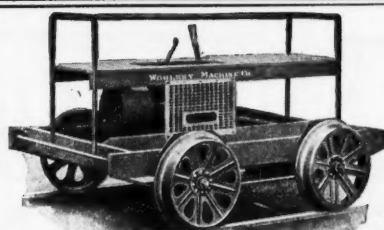
Fire may be shut off when crossing bridges. No drip of oil.

Fire relights automatically when fuel is turned on. Outfit carries supplies for a full day's operation. Any speed from 1 to 20 miles per hour on its own power.

All steel construction—safe and dependable.

Four-Wheel Drive and Four-Wheel Brake—ample traction and safety.

Chrome Nickel Steel Ball-Bearing Axles—Strong and Easy-Running.

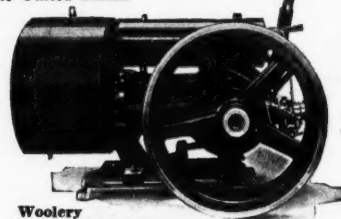


WOOLERY

Railway Motor Cars and Motor Car Engines

Woolery Truss-Frame Railway Motor Cars, while of light weight, possess extraordinary strength. When equipped with our new 2-speed transmission and powered with either the Woolery Model "C" (9 h.p.) or the Model "CC" (18 h.p.) engine, it is a universal car that meets all-around requirements.

Because of their lighter weight, greater power, and less cost per horse power, Woolery Reversible, Ball Bearing, Motor Car Engines have been adopted as standard equipment on some of the largest railroads in the United States.



Woolery Model "C"

WOOLERY MACHINE CO.

Write for Prices and
Further Information

Minneapolis, Minn.

The Frog, Switch & Manufacturing Carlisle Company Pennsylvania

Established 1881

FROG AND SWITCH DEPARTMENT

MANUFACTURERS OF
MANGANESE INSERT FROGS, CROSSINGS
AND SPLIT SWITCHES
SOLID MANGANESE FROGS AND
CROSSINGS
PLAIN FROGS, SWITCHES, CROSSINGS
SWITCH STANDS AND ACCESSORIES

MANGANESE STEEL DEPARTMENT

MANUFACTURERS OF
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HIGH GRADE MANGANESE STEEL CASTINGS
FOR FROGS, SWITCHES AND CROSSINGS
JAW AND GYRATORY CRUSHERS
CEMENT MILL, MINING MACHINERY, ETC.
GRAY IRON CASTINGS

STURDY AND RELIABLE

LUFKIN TAPES

In Patterns Best for Every R. R. Requirement—
Surveying—Engineering—Construction—M. of W.
Steel Tapes with *Instantaneous* Readings and
Nubian Finish. Michigan Chain (Chicago Style)
Tapes with 1/2 gage mark and improved pattern reels.

Among our popular woven lines are the "Metallic," and the low priced tapes for all common uses, the Ass Skin, and the Universal No. 733R Linen Corded with First Three Feet Reinforced.

STOCKED BY RAILWAY SUPPLY AND HARDWARE HOUSES.

Send for
Catalogue

THE LUFKIN RULE CO.

SAGINAW, MICH.
New York Windsor, Ont.



7 REASONS WHY THE LAWRENCE BUMPING POST WILL SAVE YOU MONEY:

1. It anchors to the earth and takes the shock into the earth where it belongs.

2. It does not damage cars or contents of cars.

3. A safety device—By protecting the public and Railroad interest.

4. More revenue car mileage at less cost.

5. No replacements necessary. If knocked back—reset it.

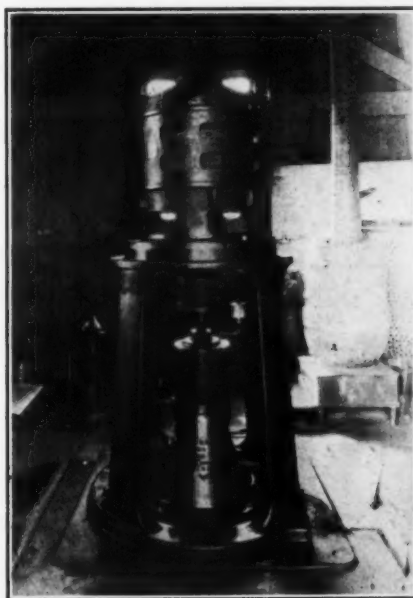
6. It has been tested, tried and proven over a long period of time.

7. Low installation cost.

Ask for circular and price

Louisville Frog & Switch Co.

Louisville, Kentucky



FIVE YEARS' SERVICE ON THE WABASH

At Adrian, Mich., the water formation is a quicksand in which several types of screen were tried and proved to be failures. All attempts indicated that a satisfactory, lasting well could not be obtained.

Five years ago a Layne Gravel Wall Well System was completed there for the Wabash Railway Company.

Today the well continues to supply its 350 gallons per minute and the pump runs as it did when new; delivering the water against 27 pounds pressure.

The total cost of pumping water during the year 1924 was 2.09 cents per 1000 gallons.

LAYNE & BOWLER Co.

MEMPHIS, TENN.

HOUSTON, TEX.

LOS ANGELES, CALIF.

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|-----------------------------------|--|
| LAYNE-BOWLER CHICAGO COMPANY..... | 37 W. Van Buren St., Chicago |
| LAYNE-OHIO COMPANY..... | 8 East Broad St., Columbus, Ohio |
| LAYNE-NEW YORK CO..... | 39 Church St., New York City |
| LAYNE-SOUTHEASTERN CO..... | First Nat'l Bank Bldg., St. Petersburg, Fla. |
| LAYNE-LOUISIANA CO., INC..... | Lake Charles, La. |
| LAYNE-ARKANSAS CO..... | Stuttgart, Ark. |
| LAYNE-CENTRAL CO..... | Memphis, Tenn. |
| LAYNE-WESTERN CO..... | Mutual Bldg., Kansas City, Mo. |
| LAYNE-TEXAS CO..... | Houston, Tex. |
| LAYNE-BOWLER WISCONSIN CO..... | Milwaukee, Wis. |



The neatest road-beds in America are on Jordanized lines.



GENUINE
"KEYSTONE"
 Positive
 Lock Washers



Use Positives and forget to worry about the damage caused by vibration. Positives are the cheapest protection and the best.

Genuine KEYSTONE Positive and Plain Lock Washers made exclusively by

The Positive Lock Washer Co.

Miller St. & Ave. A, Newark, N. J.

80 James Watt St.
 Glasgow, Scotland

H. L. Van Winkle
 160 Beale St., San Francisco, Cal.

PUMPS

A TYPE FOR EVERY SERVICE

Bulletins on request

**THE GOULDS MANUFACTURING
 COMPANY**

SENECA FALLS, N. Y.

GOULDS

1 Fifteen Parts in One

The one piece construction avoids the high cost of installing and need of frequent maintenance found in ordinary guard rail.

2 Lug Design [distinctive with ACCO]

The lugs engage the under side of the head of the traffic rail, preventing overturning of the guard rail.

3 Renewable Face

The manganese steel inserts insure long life and at the same time make possible easy replacement.



This stops another maintenance problem

One-Piece Guard Rail eases the battle for safe, well-kept track at less cost. ~ ~

A one-piece guard rail with renewable manganese steel face is about the most lasting piece of equipment you can put on the right-of-way. And it requires practically no maintenance, as contrasted with the constant adjustment necessary on ordinary rail—the realignment for proper flange-way—the renewal of foot guards—new installations when ordinary rail wears out.

The single open hearth casting of ACCO One-Piece Guard Rail

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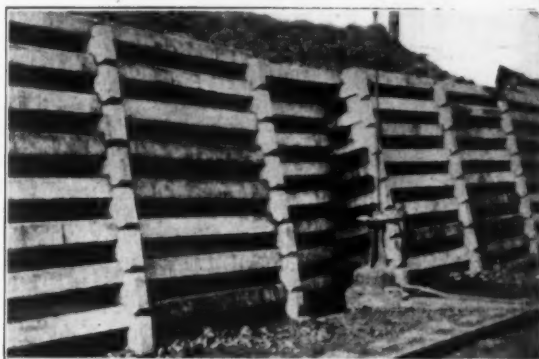
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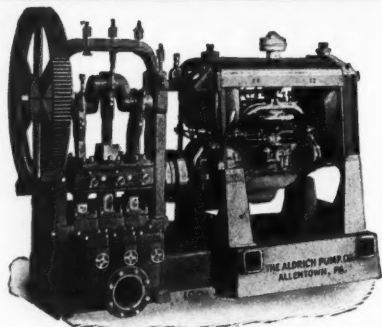
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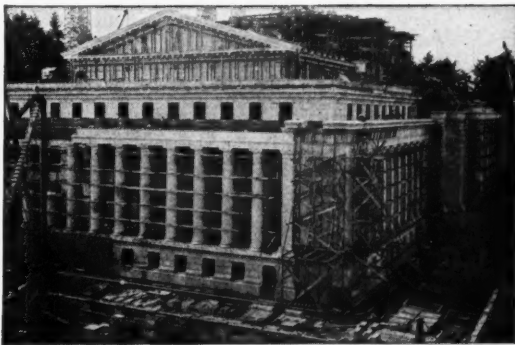
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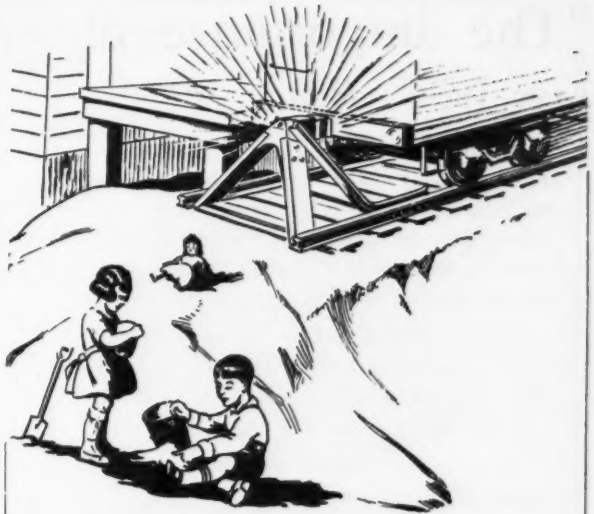
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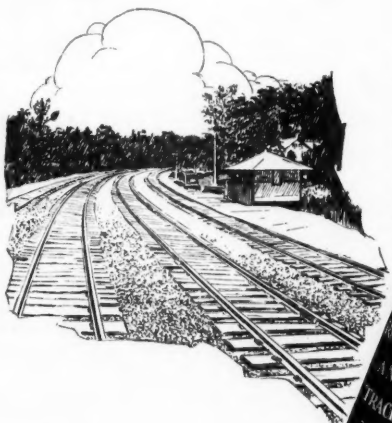
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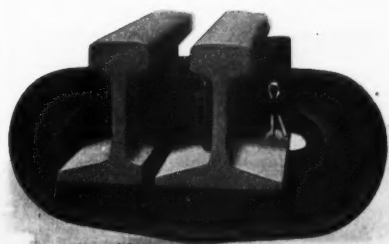
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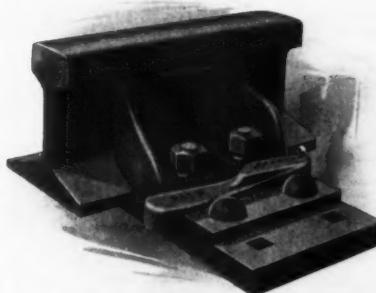


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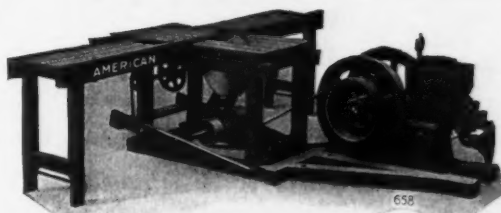
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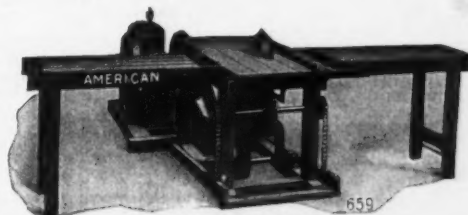
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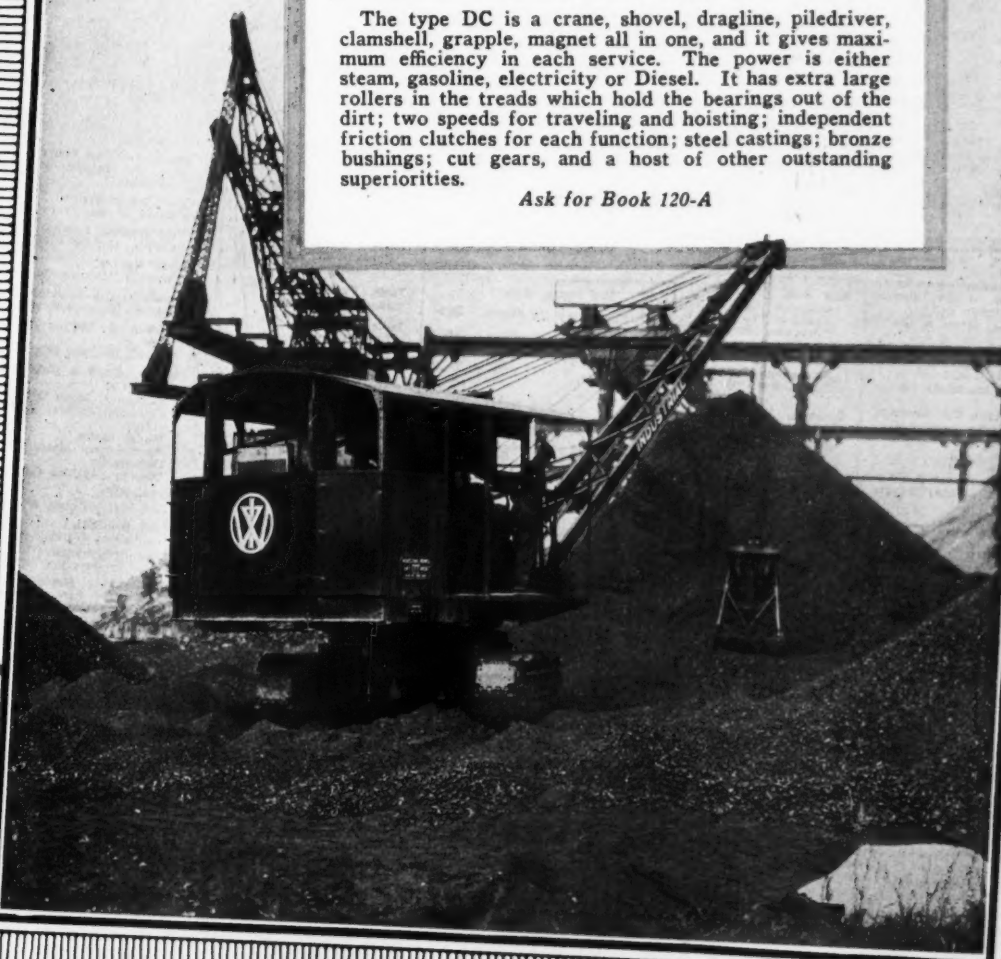


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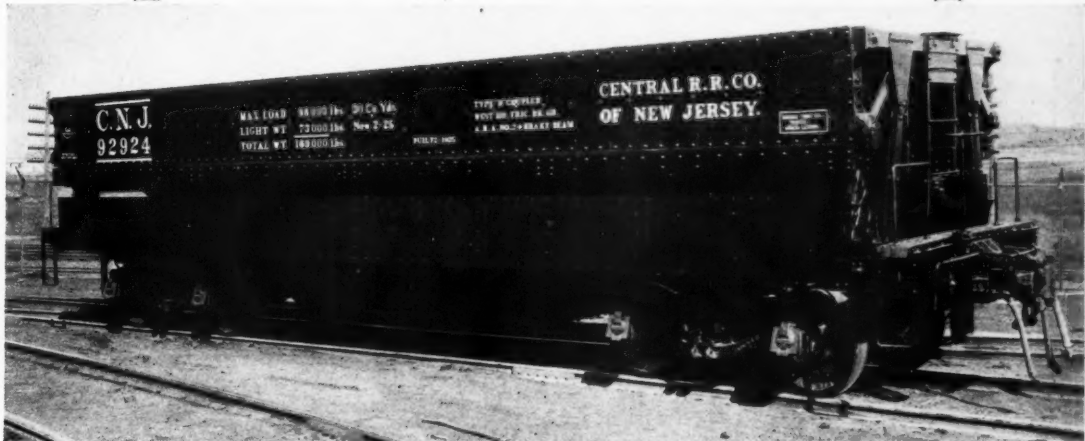
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| Posts, Fence. See Fence Posts. | Roller Bearings. Hyatt Roller Bearing Co. | Spreaders, Car. See Cars, Spreader. | Ties. International Creosoting & Construction Co. | Water Softening Plants. American Water Softener Co. |
| Power Plants, Portable. Electric Tamper & Equipment Co. | Roof Slabs. Massey Concrete Products Corp. | Spreaders, Ballast. See Ballast Spreaders. | Tie Plate Clamps. Q. & C. Co. | Chicago Bridge & Iron Works. |
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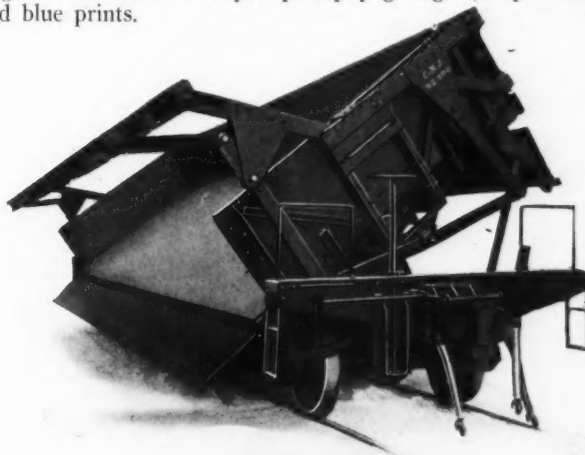
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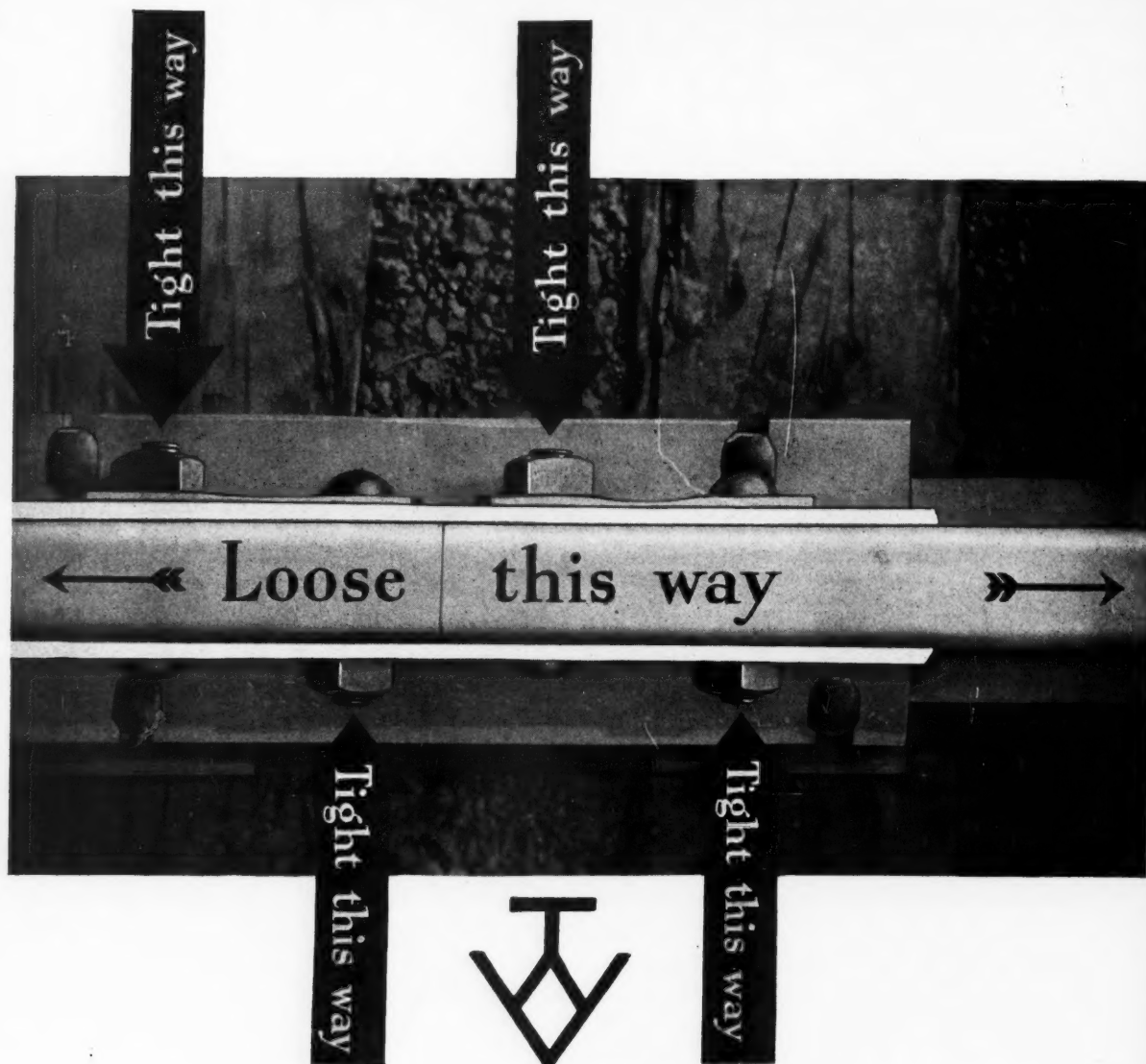
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But bolts that are *too* tight have been known to cause "bunched expansion" of the rails. Unless the rails can expand individually, all the expansion will take place at the first loose joint with disastrous results.

Verona Rail Joint Springs achieve an unique one way tightness. Their tremendous reactive pressure makes the bolts tight and keeps them tight in spite of bolt stretch, rust, or wear. But that tightness is delivered in the direction of the bolt—not in the direction of the rail. No matter how tight the bolts may be drawn up with Verona Rail Joint Springs, they never restrict the normal expansion at the joint. As a result, bunched expansion will not occur with spring-tightened bolts any more than with dangerously loose bolts. This is not mere theory. The roads that have standardized on rail joint springs have definitely solved two major track problems—keeping their bolts tight and avoiding bunched expansion.

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